PUBLIC REGULATION OF PRIVATE FORESTS AND A POSSIBLE PROGRAM FOR PUBLIC REGULATION

FROM

"A NATIONAL PLAN FOR AMERICAN FORESTRY"

A Report Prepared by the Forest Service, U.S. Department of Agriculture
in Response to S. Res. 175 (72d Congress)

SENATE DOCUMENT No. 12 – SEPARATE No. 11

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PUBLIC REGULATION OF PRIVATE FORESTS

By W. N. Sparhawk, Senior Forest Economist

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INTRODUCTION

The numerous ways in which our forests contribute to the well-being of communities, States, and Nation have been described in preceding sections of this report. They are the source of indispensable raw materials which support great industries and afford means of livelihood to millions of people. They help to conserve water supplies without which our cities and villages, many of our industries, and an important portion of our agriculture could not exist. They help to maintain the navigability of our streams and harbors. They protect our soild from washing away. They ameliorate the climate. They are the home of many kinds of wild life which are useful or afford pleasure to man. In many ways, they promote the health and happiness of our people.

WITH UNRESTRICTED FOREST EXPLOITATION, THE PUBLIC HAS LOST

Among these multiple services of forests, private owners in most cases derive direct personal benefits from only a few. Under the existing system of profit economy, they naturally seek to derive the maximum immediate benefits, without regard to the less tangible public values which are involved. This would not be objectionable if there were no conflict between what individuals conceive to be to their immediate interest and the long-run public welfare.

Unfortunately, such a conflict does exist in the majority of instances. In seeking immediate profit, great injury has been done both to individuals and to the public. Many communities and regions have been impoverished by the devastation of their forests. Millions of acres of fertile land from which the forest cover was removed have been worn out and rendered utterly worthless by erosion. Water supplies have become irregular, streams have been muddied by heavy burdens of silt, and channels have been obstructed, necessitating huge public expenditures to keep them open and to control the ravages of floods. In many places, forest destruction has resulted in excessive depletion of our fish and of upland game and fur-bearers. Burned snags and stumps have replaced the cool shade of green forests along many of our highways, and the beauty of lake shores and river banks has been destroyed.

POSSIBLE REMEDIES

These processes are still going on. Neither the States nor the Nation can afford to let them continue. There are three possible ways of putting an end to them, all of which already have a place in our public policy. These are: (1) Education and persuasion of the private owners, coupled with assistance by the public; (2) public regulation of the practices of private owners; and (3) acquisition of the forests by the public.

PUBLIC OWNERSHIP

The simplest and the surest method would be for the public to take over the forests and manage them as public properties. This is being done on a comparatively small scale. It may be done on a much larger scale in the future. (See section on the "Probable Future Distribution of Forest Land Ownership.") However, acquisition by purchase is likely to be expensive and consequently slow, and judging from past experience, acquisition by gift, exchange, or default is uncertain, unsystematic, and most likely to come about after the forest values have been seriously impaired. It is necessary, therefore, to consider whether other methods may also be effective in protecting the public's interests.

UNDER CONTINUED PRIVATE OWNERSHIP

Policies with respect to public acquisition of forest land will depend to a considerable extent on whether the land will be utilized by private owners in such a manner as to safeguard the public interests. If this could be depended on, public acquisition would be largely unnecessary. Four fifths of our productive forest land is privately owned. Obviously, public acquisition of all of it in the near future is out of the question. The greater portion of it is likely to remain in private ownership, at least for many years. Public welfare requires continued maintenance of forest cover on most of it, and continued production of timber on a very considerable portion.

Experience here and abroad does not indicate that private owners on their own initiative and unassisted will utilize the land for timber growing or even maintain a forest cover to the extent that is desirable or necessary. Their failure to do so results from several causes, including lack of knowledge as to how to use the land effectively for forestry; the belief that other uses will be more profitable; lack of financial resources; lack of assurance that such use will yield a profit, or even a well-founded belief, in many instances, that it will not; desire to liquidate their investment and lack of interest in the land after the timber has been removed.

Public agencies can do much to stimulate private forestry through research and education, and demonstration of forestry practices. They can do more through various measures of public cooperation and assistance, as discussed in other sections of this report. However, cooperation which is optional with the forest owners, or public assistance which is not accompanied by the obligation to handle the forest conservatively, has yielded almost negligible results so far as the adoption of good forest practices is concerned. Even though the public pays a considerable portion of the cost of fire protection in

many States, the owners of less than 6 percent of the privately owned forest are making a conscious effort to keep it productive. Judging from results thus far, there is little ground for confidence that the major portion of our privately owned forest land will be used properly unless there is some degree of public control. Such control is the rule, at least for those classes of land most vitally affecting the public interest, in nearly all except the more backward countries.

PUBLIC REGULATION OF PRIVATE PROPERTY IS NOT UNUSUAL

The right of the public to regulate commerce and the various forms of privately owned utilities which serve the public is generally recognized in the United States as well as in other countries. Public restriction on the use of forest land, however, has been opposed on the ground that it involves infringement upon the rights of private property and radical or even revolutionary extension of the sphere of government. Consideration of the facts shows that that is not the case. Such objections overlook the historical facts as to the nature of private property in land and the functions of government. Title to landed property in the United States, as in England, and in most, if not all other countries, originated in a grant from the government. In earlier times, the recipients or their successors were obliged to render military or other service to the King or to the government as a condition of holding the land. Even today, in the United States, private ownership of land is not absolute. Land owners who fail to contribute to the support of government through taxation forfeit their land to the Government. Many owners of cut-over land have been doing this in recent years. Both the State and Federal Governments retain, and frequently exercise, the right to expropriate any private land that is needed for public purposes, and they even delegate similar authority to certain classes of private corporations, such as railroads, where such expropriation is in the public interest.

A major object of organized government, whatever its form, is to control or restrict, so far as the public interest may require, the actions of individuals that may affect the welfare of other individuals or of the group as a whole. Absence of such control would mean anarchy. The character and extent of governmental restriction or control vary with the political philosophy and the stage of economic development of a people. As social organization and economic relations become more complex, control becomes desirable with respect to matters over which it was not desirable at earlier periods. With increasing density of population and increasing need for efficient utilization of limited natural resources, the necessity of social control over such use increases both to prevent harm to individuals, and also to insure the present and future welfare of society as a whole. From the earliest times, governments have concerned themselves, in varying degree, with bringing about that utilization of their land and other resources which would promote the general welfare.

FARM LAND

With agricultural land, most countries have sought to accomplish this primarily through distributing it to individual owners and insuring more or less stability of ownership. The owners have enjoyed practically absolute freedom to use their land as they saw fit, although

governments have not hesitated to exert rather strict control over certain phases of the use of private farm property in emergencies when such action was necessary to protect the interests of the public. Examples of such governmental interference in this country are the campaigns against foot and mouth disease, bovine tuberculosis, cattle tick, corn borer, and Mediterranean fruit fly; the requirement in some wheat-growing States that barberries be eradicated; the prohibitions in several States against planting currants and gooseberries near white pine forests and against growing red cedars near apple orchards (Virginia); the requirement in many States that livestock be kept under fence; and the obligation of property owners to clean up noxious weeds so as to prevent their spread to neighboring land.

In the past, the economic factors and conditions governing the production of agricultural crops have been such that the owners had an incentive to utilize their land generally in the public interest. The present alarming situation with respect to erosion in certain portions of the United States demonstrates that it has not always been so utilized. In recent years the economic situation of agriculture has changed until there is some reason to believe that individual self-interest alone, at least in the present stage of enlightenment, is no longer adequate to safeguard the public interests in the utilization of farm land.

Recognizing this, governments have endeavored to promote the voluntary adoption of improved methods through research, education, demonstration, and other forms of assistance. Much has been accomplished in this way, but uncoordinated action by individuals does not seem to be enough. The need for some degree of public or quasi-public control over agricultural production or marketing is coming to be recognized in many countries. Russia has her 5-year plan and State farms; Italy has her "battle of the wheat"; we have our Federal Farm Board, to say nothing of the laws proposed to restrict cotton production in several States. A number of countries prohibit or restrict the agricultural use of land that is liable to become seriously eroded and thus cause damage to other property or to the public interests.

MINERALS

The development of mineral resources also has generally been left to private initiative in most countries, except for restrictions designed to safeguard the workers. An important exception in this country is the Federal law restricting hydraulic mining in California in the interest of navigation. (U.S. Stat.L., vol. 27, p. 507.) Mining being strictly an extractive enterprise and highly speculative, rapidity of turnover has been encouraged and great waste of the resources has resulted. Many of the mineral industries have now reached a point where they themselves recognize the need for some form of group control, either by the public or through group cooperation of one kind or another, in order to regulate output and conserve the resource. Examples in the United States are the coal, petroleum, and copper industries.

WILD LIFE

The individual States, and the Federal Government in the case of migratory birds, have retained control over the exploitation of wild animal life, even though most of it breeds and lives on privately owned

land. Moreover, large expenditures of public money have been made and are still being made to conserve and propagate our fish, game, and other wild life resources.

URBAN LAND

Many public restrictions on the use of urban land are so obviously necessary and of such long standing that they are accepted by most people without question. In this class are building codes, fire regulations, sanitary codes, and the like. Most, if not all of them, are based on the principle that an owner may not use his property in such a manner as to harm or threaten harm to his neighbor or to the community as a whole. Many newer restrictions, typified by the various zoning laws, that have grown up within comparatively recent years carry this principle even farther, but generally have not been considered unreasonable infringements on private property rights.

WATER RESOURCES

The private use of water resources, even though the stream originates on private land, is subject to a greater or less degree of public control by most States, and in the case of navigable streams by the Federal Government, for such purposes as maintaining navigation, preventing waste of irrigation water, preventing damage to owners of property down stream from dams, preventing pollution of domestic water supplies or of fishing streams, etc. In a few instances the public has gone a step farther and regulated the use of land bordering the streams or on their headwaters, so far as might be necessary to accomplish the above purposes. This has been done, for instance, under the law regulating hydraulic mining in California, previously mentioned.

FORESTS

Individual owners have not felt the same incentive to handle forests for continuous production as in the case of farm lands. As with mines, they have deemed it more advantageous to exploit the timber as quickly as possible, and leave the regeneration of the forests to chance. This has resulted largely from the long-time nature of forest crops and the interchangeability of timber capital and timber product. It has been the common experience of all civilized countries that unguided, voluntary action by private owners will not assure such use of forests as will guarantee their perpetuation or safeguard the interests of the public. Public control over the use of private forests is a live question all over the world. In recent years it has become increasingly evident in the United States that unrestricted freedom of individual action is leading not only to waste of a great natural resource, despoliation of forest lands and lasting injury to the general welfare, but also to the ruin of the lumber and other forest industries themselves.

EXISTING RESTRICTIONS ON FOREST OWNERS IN THE UNITED STATES

As a matter of fact, some aspects of forest-land use by private owners are already subject to a considerable degree of public regulation in the United States. So far, the Federal Government has not undertaken such regulation, although, of course, the various Federal

laws relating to the organization and control of business in general affect forest use indirectly. Practically all of the individual States, however, have adopted legislation designed not only to protect forest property from damage by others than the owners, but also in some degree to prevent an owner from using his land so as to cause direct injury to others. These restrictions have to do mainly with the prevention, suppression, and use of fire so that it cannot spread to another's property. No attempt has been made to require such management as will avoid less direct injury to others, through erosion, silting, or irregular stream flow. Nor, with a few minor exceptions, have the States undertaken to prevent an owner from damaging or destroying his own forest, or to require him to keep his

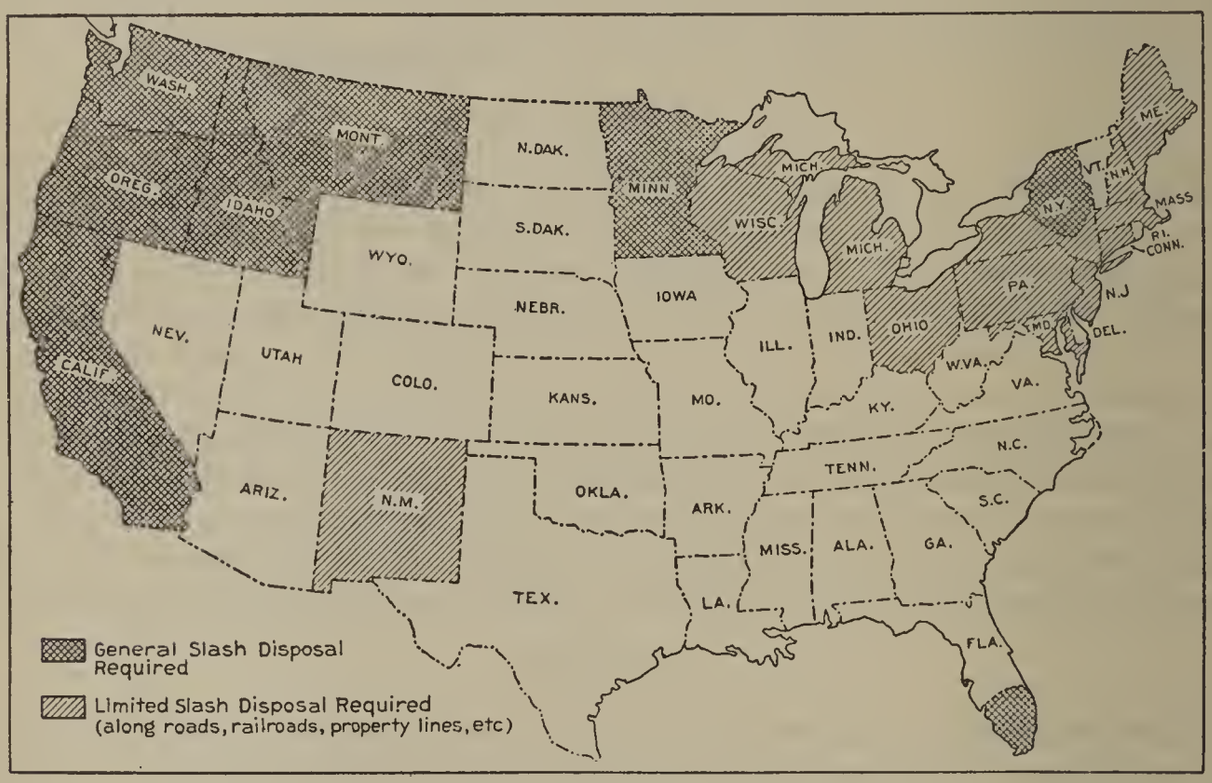

FIGURE 1.—States requiring slash disposal.

forest land productive, or to preserve esthetic or recreational values for the benefit of the public.

The various State regulatory measures deal with the following subjects: Control of fire, control of insect pests, control of tree diseases, silvicultural or other measures designed to maintain the productivity of forest land.

CONTROL OF FIRE

The laws of every State restrict the use of fire by owners or operators of forest or woodland or impose requirements designed to prevent the spread of fire to the property of others. These restrictions and requirements vary widely in scope.

REDUCTION OF FIRE HAZARD

Regulations with this purpose are chiefly in connection with logging operations. California, Oregon, Washington, Minnesota, New Jersey, and Florida (in the Everglades only) provide that any dangerous slash or inflammable debris (as determined by the State forester or equivalent agency) must be disposed of by the owner, or at his expense, in a manner approved by the State forester. In these States it is not

necessary that the debris be the result of the owner's operations. Idaho, Montana, and Pennsylvania require that slash resulting from logging operations must be disposed of as required by the State forester or fire warden. New York requires the lopping of tops over 3 inches in diameter within the "fire towns." Thirteen States have special requirements for the removal of slash along highways and railroad rights of way. (See fig. 1.) In Maine, Minnesota, New Mexico, and New Hampshire slash must be removed from strips of specified width along the boundaries of adjacent property; in Wisconsin along the boundaries of county forests, and in Minnesota along lake shores.

In Oregon the operator must fell snags not only near engine settings but also along property lines and near areas of reproduction. In Washington the State forester may require felling of snags on any part of the operation where he considers that they constitute a fire hazard.

In 23 States, logging locomotives and stationary engines (unless they burn oil), and in some instances portable and other mills, must be equipped with efficient spark arresters and other devices to prevent the start of fires. Ten of these States require that cleared lines be maintained along logging railroads and around engine and mill settings, in order to prevent fires from spreading.

Chiefly in order to facilitate inspection and enforcement of slash disposal and similar requirements, several States provide that owners or operators must report intended cuttings and new set-ups of portable mills. For example, Maine requires operators of portable mills to obtain licenses, which may be suspended during dry periods. In New Hampshire portable mills must be registered with the State forester and must get a permit before operating in each location. Massachusetts provides that portable mills cutting over 10,000 board feet at a setting must notify the State forester as to the location, size of the lot, and the approximate dates of operating. Minnesota requires that the State forester be notified before any timber is cut in a forest or wild land area (except in clearing agricultural land or to cut one's own firewood), and that a notice be posted on the land giving the legal description of the land to be cut over and naming the person who will be responsible for disposal of the slash. New Hampshire requires advance notice before pine is cut, with information as to the name of the owner and the location and size of the lot. Timber owners and sawmill operators are also obliged to report the quantity of timber cut each year. In Rhode Island, timber owners must register with the State Bureau of Forestry before cutting for other than domestic use.

USE OF FIRE

Under the laws of practically all of the States it is a misdemeanor to let fire burn on one's own land unless it is kept from escaping and damaging the property of another. (In Nevada this is a felony.) In most of the States, the person responsible for the fire not only is liable for damages but may also be punished by fines, imprisonment, or both.

The laws of 32 States contain some sort of restriction on the burning of slash, brush, grass, or other material on one's own land. Thirteen

States require that persons burning over their land must give advance notice to adjoining owners; and 7 of these and 6 others require specifically that "all due precautions" must be taken to prevent the spread of fire to other lands. Seven States require that fire lines be cleared around the areas where the burning is to be done. In 16 States, permission of a fire warden or other public official must be obtained before an owner may burn brush, etc., on his own land, at least during the danger season; two other States require similar permits in certain districts (Florida in the Everglades and Pennsylvania on gas and oil lands). Four States (New Hampshire, New York, Rhode Island,and Pennsylvania in the gas and oil districts) require that a warden or

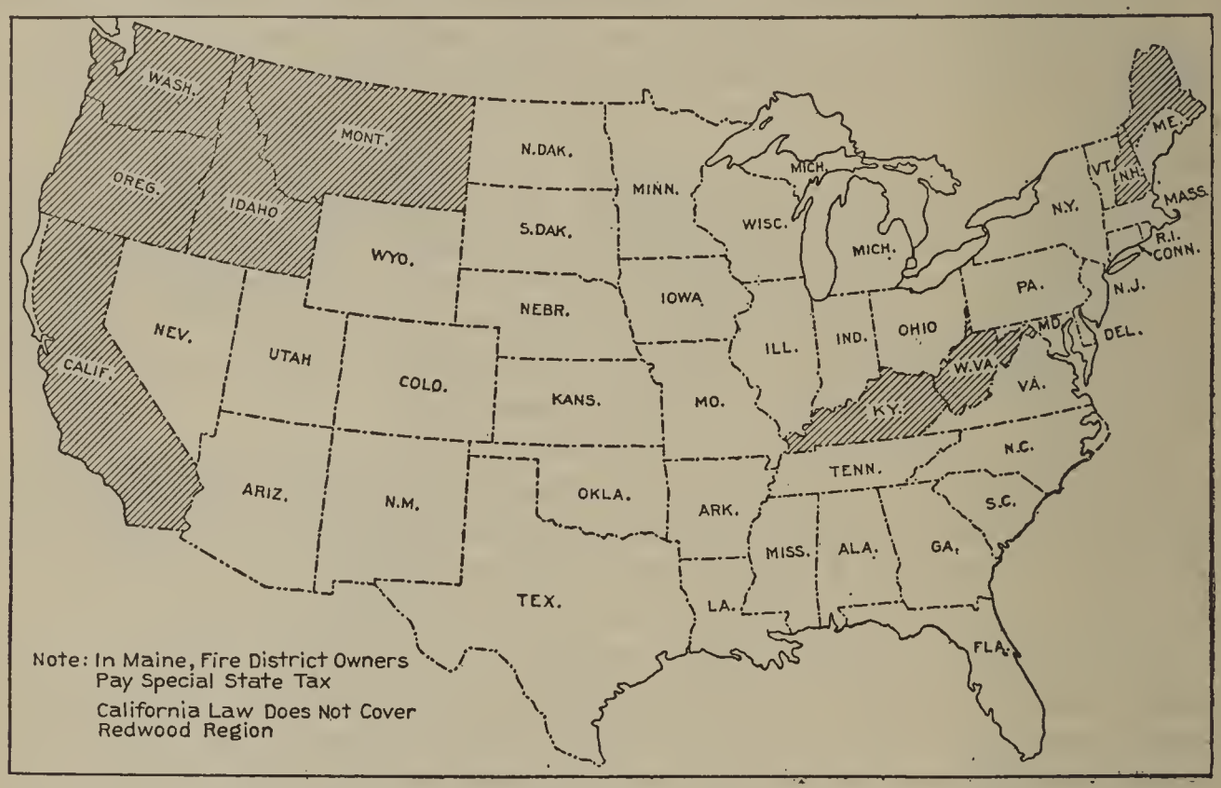

FIGURE 2.—States requiring owners to provide fire protection or to support protective organizations.

someone designated to supervise the burning be present, unless there is no danger of the fire spreading.

FIRE PATROL AND SUPPRESSION

California (except in the redwoods), Idaho, Kentucky, Montana, Oregon, Washington, and West Virginia require forest owners to provide a patrol and suppression organization approved by the State forester or corresponding official. (Fig. 2.) An owner may maintain his own organization, or he may meet the requirements through membership in and support of a recognized association which provides such protection. New Hampshire has a similar provision for holdings of more than 1,000 acres. In California, Washington, and Oregon logging engines must also be equipped with pumps, hose, and fire-fighting tools, and all snags within a specified radius of the setting must be felled. In addition, Washington requires a patrol of logging railroads following all trains. Several other States provide that the owner must make every effort to suppress fires on his own land, and that if he fails to do so the State will do it at his expense. In Maine, the State provides protection in the forest district, but collects the costs from the owners in the form of a special tax. In Vermont, towns may assess

all owners of unoccupied or uninclosed land (containing inflammable material) up to 5 cents an acre to cover costs of fire fighting (on any land), unless such owners have, during the preceding year, provided adequate protection for their land.

CONTROL OF INSECT PESTS

In a very few States, landowners are required to assist in preventing or checking damage by forest insects. California and Oregon require an owner to notify the State forester of any serious infestation by pine beetles or other insect pests harmful to timber, and also to take steps toward controlling such infestation and preventing its spread. These States also provide for the creation of control districts in which all owners must cooperate provided 60 percent of the owners request it. In Massachusetts, an owner must give notice of an infestation by gypsy or browntail moths and must destroy the eggs and nests of these moths, of tent caterpillars, of leopard moths, of elm beetles, or of "any other tree or shrub destroying pest." The State is obliged to undertake the suppression of such infestations, but may assess the costs against the landowners. In Vermont, the commissioner of agriculture may order an owner to destroy pests, including gypsy and browntail moths "or any other threatening and unusual insect pest found to be unduly injuring vegetable growth." In New York, the conservation department may establish barrier zones and within them destroy such trees and other vegetation as may be necessary to check the spread of gypsy moths.

CONTROL OF TREE DISEASES

Legislation for the control of tree diseases is found in the white pine region of the Northeast and the Lake States. In Maine the forest commissioner, in New Hampshire the State forester, in Michigan the commissioner of agriculture, and in Minnesota the commissioner of forestry may designate areas within which blister-rust control is advisable, and in these areas owners must carry out control measures as ordered. Infected pines and Ribes (currants and gooseberries) are declared public nuisances.

In New Hampshire, Michigan, and Minnesota, an owner may not plant pine or Ribes in the designated areas without a permit. In New York and Michigan black currant is declared a public nuisance, but other currants may be grown within districts designated as fruit-growing districts. Within these districts the eradication of five-needled pines may be required and such pines may not be planted without a permit. Elsewhere, if protective measures against blister-rust have been adopted, owners must eradicate Ribes within 900 feet of pine (in New York). In Vermont the commissioner of agriculture may order owners to destroy host plants and such pests or fungous diseases as he may specify. Such plants may not be replaced until all danger of spread of the disease is past. Planting of black currants is prohibited in Connecticut. In Rhode Island, the board of agriculture is authorized to make regulations regarding the planting of pines and currant bushes.

SILVICULTURAL REQUIREMENTS AND REGULATION OF CUTTING

Only two States have adopted compulsory legislation designed to prevent an operator from denuding his own land by cutting. Louisiana requires an owner or operator cutting timber or bleeding trees for turpentine to leave standing and unbled an average of two seed trees per acre of the kind cut or bled and at least 10 inches in diameter at breast height, on each 10 acres. In New Hampshire, a person cutting pine must leave on every acre (where pine constitutes 75 percent or more of the stand) at least one 10-inch wind-firm pine tree, capable of bearing an abundance of cones. The Mississippi law provides that owners or operators cutting timber or turpentining shall be "encouraged" to leave standing or unbled an average of one seed tree per acre. Nothing is said as to how the encouragement shall be brought about.

A few States provide for a certain degree of control over the time, method, and extent of cutting where the owner has been given a quid

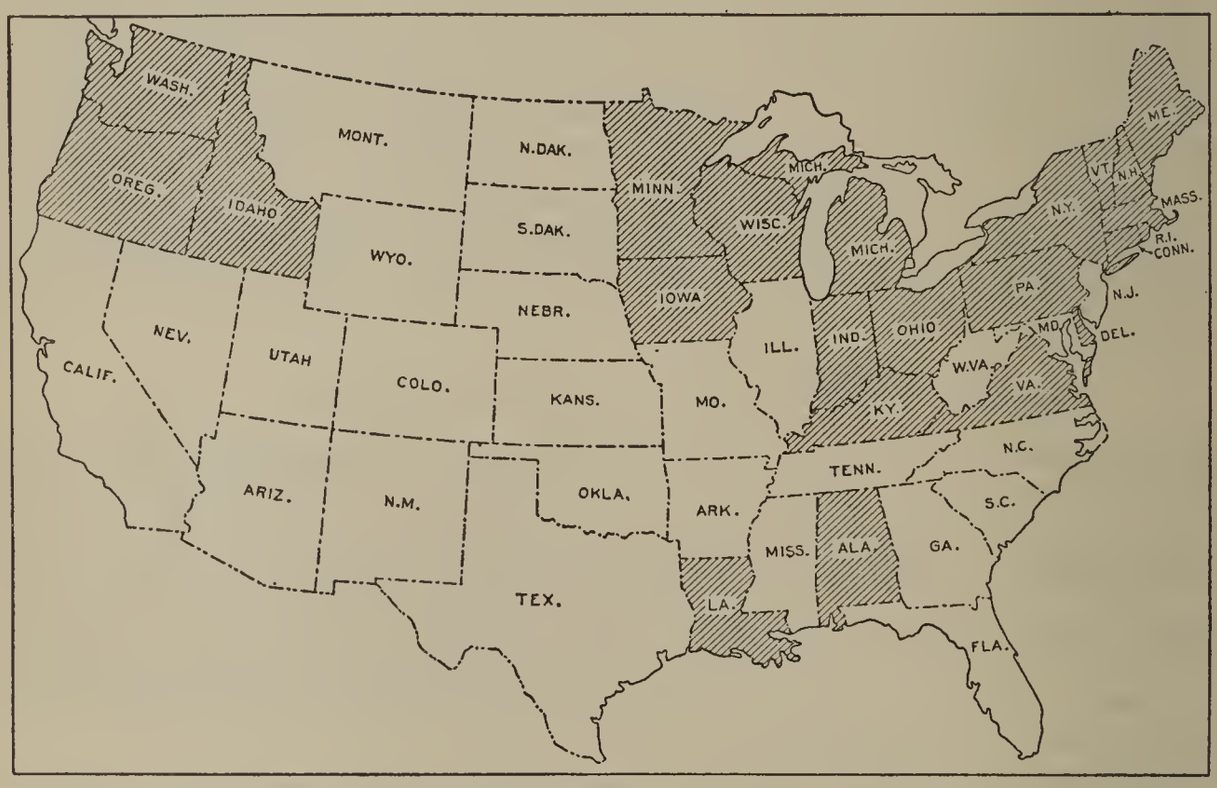

FIGURE 3.—States providing for some degree of public control over classified or "auxiliary" forests.

pro quo in the form of tax concessions (fig. 3). In the main, this control is optional with forest owners, for they do not become subject to it unless they apply to have their lands classified under the tax laws.[1] These forests are classified under various designations, such as "reforestation lands" (Oregon, Idaho, Washington), "forest crop lands" (Wisconsin), "forest plantations" or "native forest lands" (Indiana), "forest lands" (Ohio, Connecticut), "forest reservations" (Iowa), "forested or reforested lands" (New York), "forest, game, fish, or recreation reserves" (Virginia), "young timber lands" (Vermont), "classified forest lands" (New Hampshire, Massachusetts), "forestry reserves" (Kentucky), "private forest reservations" and "commercial forest reserves" (Michigan), "commercial forest plantations" (Delaware), and "axuiliary forests" (Minnesota, Pennsylva-

[1] Information regarding control over classified forests is based largely on "Digest of forest tax laws in the United States in effect Jan. 1, 1932," Progress Report of Forest Taxation Inquiry, No. 16 (mimeographed).

nia, Maine, Alabama). In some States the owners are merely required to report the quantity of timber cut, as a basis for computing the yield or severance tax to be paid; in other States they are subject to restriction on methods of cutting or forest management.

In Alabama, timber on auxiliary forests may be cut, turpentined, or otherwise utilized only under permit and in accordance with rules formulated by the forestry commission. In Delaware, timber (except dead and injured trees) may not be removed without the approval of the State forestry department. In Idaho, the property must be managed in compliance with the law regarding fire protection and slash disposal, and in compliance with such reasonable regulations as the board of forestry may prescribe for the care of the forests, cutting and removal of timber, and use of the forage. Before cutting any forest products, the owner must give 30 days' notice to the State board of forestry. In Iowa, not more than one fifth of the number of trees on a "forest reservation" may be removed in any one year. In Kentucky, the "forestry reserves" are leased by the State, which controls cutting on them. In Louisiana, classified forests must be maintained in a growing and thrifty condition, must be protected from fire, so far as practicable, and must be grown in accordance with rules laid down by the commissioner of conservation and under his supervision.

In Michigan an owner may cut merchantable forest products only with the permission of the department of conservation. In Minnesota he must manage the forest for the production of merchantable timber under a detailed working plan prepared by the commissioner of forestry in collaboration with the chief of the forestry division of the State university. Only timber designated by the commissioner may be cut. New Hampshire requires merely that the land be kept stocked with trees sufficient to promise a prospective average yield of 25,000 board feet per acre. In New York forests must be cut according to the principles of practical forest management as directed by the conservation commission, and may be thinned with the commission's approval. Ohio requires classified forests to be given reasonable protection and to be cared for and managed according to regulations of the State forester. Rhode Island requires a working plan, which must be approved by the State commissioner of forestry.

In Oregon classified land under contract is to be held for the growing of forest crops upon terms and conditions required by the board of forestry. Harvesting of timber, bark, forage, or other product without permission of the State board of forestry is prohibited. In Pennsylvania auxiliary forests must be cared for and may be thinned under the direction of the department of forests and waters, which also is to prescribe methods of cutting merchantable timber and designate the trees to be cut. In Vermont cutting must not be done in such a way that "proper forest conditions are not maintained", and the local assessors must be notified in advance of cutting. In Virginia, where the land is leased to the State, the State forester controls the management of the land and the method and time of cutting timber. In Washington timber may be cut only with the permission of the State forest board, and cutting must be done and the land reforested and protected in accordance with regulations prescribed by the board. In Wisconsin an owner of classified land must notify the conservation commission and the tax commission in advance of cutting.

Five States seek to prevent the exemption of mature timber by providing that unless it is cut the land will cease to be classified. In Massachusetts the stand must not exceed (for more than 2 years) an average of 25,000 board feet of softwoods or 10,000 feet of hardwoods; in New York the limits are 40,000 and 20,000 feet, respectively. New Hampshire specifies a maximum of 25,000 feet, regardless of species, and in Vermont the timber must be cut when the "listers" (assessors) consider it mature. California provides that a special board shall determine when timber is mature. If a considerable area of forest should be classified, these limitations might in some instances be a handicap to rational forest management. They were adopted presumably for the purpose of heading off the opposition of nonforest-owning taxpayers.

In Connecticut, Iowa, Indiana, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Ohio, Pennsylvania, Vermont, and Washington, the land must be kept stocked with trees of valuable species, and planting may be required unless the land restocks naturally after cutting. In Connecticut, Iowa, and Indiana grazing of livestock is forbidden in classified forests. In Michigan (wood lots) it is subject to restriction, and pasturage which is detrimental to the trees is forbidden in Vermont. In Delaware, the owner must take proper precautions against damage by fire, grazing, or otherwise.

EFFECTIVENESS OF EXISTING RESTRICTIVE LEGISLATION

On the whole, existing laws designed to regulate the handling of private forests are not particularly effective in most of the States. The general restrictions on the use of fire, including such requirements as burning permits, closed seasons, use of due precaution, spark arresters, and precautionary measures in connection with logging operations, are fairly well enforced in most of the Northeastern, Northwestern and Lake States. In several of these States enforcement is spotty, depending upon the individual warden. In most of the Southern and Central States, little attempt is made to enforce the forest fire laws.

Some but not all of the States having slash disposal laws enforce them fairly well as far as slash along highways and railroads is concerned. Laws providing for general slash disposal have proved harder to enforce, and their observance leaves much to be desired, except perhaps in Washington and Oregon. Even there, there is considerable difference of opinion as to whether the methods employed produce the best results. Compulsory patrol laws have proved effective in the three Pacific Coast States, but have not been thoroughly enforced elsewhere. Legislation for the control of pine blister-rust is fairly well enforced in the States to which it applies. The seed-tree laws of New Hampshire and Louisiana are not strictly enforced, and probably would not be particularly effective if they were.

Very little information is available as to the application of public regulation on the forests which have been listed under the special tax laws of various States. However, less than 1,000,000 acres have been put under the law in those States which provide for some control over listed lands. At the most, only 2 percent of the privately owned forest land in any State has been listed. It is evident

that optional regulation under the quid pro quo principle of existing laws is not contributing very much toward the solution of our forest problem.

PUBLIC CONTROL OVER PRIVATE FORESTS IN OTHER COUNTRIES

Except for earlier restrictions on hunting, there was very little public interference with the management of private forests in Europe until early in the sixteenth century. At that time wood was still the principal building material and the universal fuel. Populations and industries were growing and with them the necessity for adequate timber supplies. Long-distance transportation of wood was possible only by water. The accessible forests in many regions were becoming badly depleted. It was natural, therefore, that governments should feel concerned over the prospects of a timber shortage and should take steps to forestall it. Between 1500 and 1789 several of them, including France, most of the German States, and Russia, undertook to prevent further destruction of the privately owned as well as the public forests. Many of the forest ordinances of this period forbade owners to clear their forests or even to cut timber without permission of the authorities, and in some instances it was required that government foresters mark the timber before cutting.

These laws were not always strictly enforced, and finally, under the influence of the French Revolution and the doctrines of Adam Smith, practically all of them were repealed or fell into disuse. For several decades thereafter, owners were allowed to manage their forests practically without restriction. Devastation was accelerated, but the development of railroad and other transportation, the increasing use of coal, and the growth of international trade made the danger of a timber famine seem remote.

It was not long, however, before widespread devastation of forests was seen to have other results of even greater public concern than the shortage of a useful commodity. Disastrous floods in many European countries, accompanied by great property damage and loss of life, were attributed to the destruction of the mountain forests. Maintenance of the protective function of the forests, rather than the prevention of a timber shortage, was put forth as a reason for state restriction on the management of private forests. Most of the restrictive legislation during the past century had this as its principal object. France incorporated such restrictions in her Forest Code of 1827, Austria and Bavaria followed in 1852, Prussia in 1875, Italy in 1877, Wurttemberg in 1879, Russia in 1888, Norway in 1893, Sweden in 1903, and Spain in 1908. In 1874, following a series of flood disasters, the Federal Government of Switzerland was given authority to supervise the management of mountain forests. In Japan, heavy flood damages extending over several years led to the adoption in 1882 of legislation restricting the use of forests.[2]

In most countries these laws applied only to a comparatively small proportion of the privately owned forests. There was little or no control over the remainder until after 1900. Even in Germany before

[2] Fernow, B. E., A Brief History of Forestry. 506 p. Cambridge, Mass., 1911. See also Schwappach, Adam, Forstgeschichte, ch. XVII in Handbuch der Forstwissenschaft, ed. 4, bd. 4. Tübingen, 1927.

the World War, 68 percent of the private forests were free from any state supervision.

Since 1900, and particularly since the war, the scope of public control has been greatly broadened in some countries, and extension of control is being urged in most of the others. The maintenance of timber supplies has again become a prominent factor in the legislation of many countries. The fear of a general timber famine, to be sure, has not played such a prominent role as it did in the earlier legislation. Post-war efforts to build up sustained timber production arise partly from the growing spirit of nationalism which makes each country desire to be as nearly self-sufficient as possible. In many countries the movement is based also to a considerable extent on the economic necessity of reducing unfavorable trade balances, and of utilizing the land so as to afford employment to as many persons as possible.

So far as information is available, the essential provisions for public control over private forests in foreign countries are summarized in the following pages.

Unfortunately, satisfactory information is not available as to the effectiveness of these control measures. In some countries, existing legislation is too recent for its results to be apparent. This is particularly true of those countries where it involves radical changes from former methods. In other countries, the principles of sound forest management are well understood and have long been practiced by many forest owners, especially on the large holdings. Even with these, however, the break with old traditions, the dissolution of family estates, and the changed political and economic conditions in general have recently tended to weaken the position of forestry. This has been partly responsible for recent agitation for more restrictive legislation in several countries.

Public control is probably most effective in Switzerland, where there are almost no large private commercial forests and where practically everyone realizes the necessity of maintaining a forest cover for protective purposes. In France and Germany, the various proposals for new and more restrictive laws indicate that existing legislation is believed to be inadequate. In Norway, Sweden, and Finland the laws are generally effective. In those countries control is thoroughly decentralized, and forest owners have a voice in it. Most of the large holdings were already managed along sound lines before regulatory laws were passed. Moreover, forests are so important a factor in the economic life of all three countries that their importance is well understood by everyone.

ARGENTINA [3]

Upon completion of the requisite exploration and surveys, the Argentine congress is to be asked to provide for expropriation of lands classified by the forest service (Inspection General of National Forests) as of public utility, including forests which affect the topography of mountains and slopes, help to prevent erosion of soil in ravines and torrents, protect springs and streams in general, or help to stabilize maritime dunes and prevent erosion of shores.

[3] Decreto reglamentando la explotacion de bosques y yerbales (Presidential decree of Oct. 4, 1906, on exploitation of forests). Fablet, Luis E., and Brebbia, Carlos, "Monografia forestal de la Republica Argentina." In Actes Congrès International de Sylviculture, vol. 2, p. 295–327. Rome, 1926.

Meanwhile, there is no public control over private forests except upon application by the owners and approval by the Department of Agriculture. Such forests are to be protected by the State, and may be cut or otherwise exploited only as authorized by the executive (i. e., the forest service).

In the province of Tucuman, the cutting of trees in a 100-meter belt along streams is prohibited, as is the destruction of groves in pasture lands.

AUSTRIA [4]

Two thirds of the forest area of Austria is privately owned. About two thirds of this land is in small tracts of less than 100 hectares (250 acres) owned mostly by farmers. Forest land may not be cleared for other use without the permission of the local district authorities. No forest may be devastated so as to make further timber production difficult or impossible. Freshly cut-over land must be restocked within 5 years; a longer period is allowed only in special cases. Older bare land must be reforested within one rotation period. Advance notice must be given before making a clear cutting of more than 1¼ acres (½ hectare) and the authorities may impose certain requirements as to time of cutting, reforestation, etc.

A forest may not be handled in such a way as to expose a neighboring forest to wind damage. On light soils that are easily blown, and on high mountains, clear cutting only in narrow strips or gradual thinning is permitted, and only selection cutting is allowed in forests near timber line. Disturbing of the soil must be avoided on the banks of large streams and in places where there is danger of landslides.

Grazing is forbidden in places where it will damage or prevent reproduction of the forest, and may in no case be in excess of the carrying capacity of the range. Herders must be employed unless there are other effective ways of keeping stock off reproduction areas. Gathering of forest litter is also subject to certain restrictions.

Expert foresters approved by the Government must be employed for tracts above a specified size, which depends on local conditions. Owners must notify the local authorities of the presence of insect pests which threaten other forests, and the owners of all forests which are endangered by such pests must cooperate in control measures.

Where the safety of persons or of public or private property requires special treatment of the forest as a protection against rock-slides, avalanches, washing of the soil, etc., the area may be designated as protection or "ban" forest. This is to be done by a commission, assisted by experts, upon the application of a commune or other interested party, or upon the recommendation of public officials. Protection forests are to be managed by competent persons employed for the purpose, in accordance with rules prescribed by the commission.

Under a special law for regulation of torrents (1884), the interested parties are obliged to contribute toward costs of forest planting and other corrective work, which is carried out by the forest protective organization. The State and the provinces have borne about 70 percent of these costs.

[4] Schindler, Karl, Die Forst-und Jagdgesetze der Oesterreichischer Monarchie. 465 p. Wien, 1866. Fernow, B. E., A Brief History of Forestry, p. 163–166. Cambridge, Mass., 1911. Weber, H., Forstpolitik, ch. XIX in Handbuch der Forstwissenschaft, ed. 4, bd. 4, p. 369. Tübingen, 1927.

BELGIUM [5]

Nearly 60 percent of the forest area of Belgium is privately owned. Most of the holdings are small. Under the law enacted in 1931, which takes the place of a similar provisional law of 1921, the Minister of Agriculture may forbid abnormal or excessive cutting of any woodland which is of special public importance because it serves to protect the soil on mountains and slopes, to prevent erosion by streams, to regularize the flow of streams and springs, to stabilize dunes and coasts, or because it is necessary for purposes of the national defense or public health. Cutting that removes more than half the volume of timber in high forest, or that leaves less than 75 cubic meters per hectare (about 1,000 cubic feet per acre), and cutting that removes more than 60 percent or leaves less than 25 cubic meters in coppice with-standards, is considered excessive. Broad-leaved forests of less than 10 hectares (25 acres) and coniferous forests of less than 25 hectares, as well as coppice, and coppice-with-standards where the overstory contains less than 25 cubic meters per hectare, are exempt from control.

The Belgian law differs from the French law in that a forest owner is not required to give advance notice of an intended cutting, and the restriction is not limited to clear cutting but also covers abusive cutting that is likely to lead to the same result. The Belgian law also provides that the minister may authorize excessive cutting, provided the owner will agree to undertake certain measures, such as replanting the same or an equivalent area within a specified time.

A forest owner may appeal from a decision by the minister to a commission consisting of a magistrate appointed by the King and two persons named by the Superior Forestry Council.

Another law provides for prohibiting the destruction of forests of special historic or scenic significance.

BRAZIL [6]

Owners of forest land in Brazil may apply to have their forests classified, especially in case of protection forests which serve to regularize streams, prevent erosion, promote the public health or national defense, or which are natural beauty spots or wild-life preserves. These forests must be managed in a manner approved by the forest service, as regards both timber exploitation and grazing. The Federal Government, in cooperation with local governments, is to grant special favors to compensate for the restriction. These favors may include assistance in building roads, police protection, and subsidies for planting.

BULGARIA

Less than one fifth of the forest land of Bulgaria is in private ownership. The private forest is largely coppice, and is in small units, with an average of only about 2 hectares (5 acres) for each

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[5] Bulletin Société Centrale Forestière de Belgique 28: 49–51, 342–344 (1921); 39: 81–96, 140–168 (1932). Geneau, G., in Revue des Eaux et des Forêts 70: 349–353 (1932).

[6] Decreto que dá regulamento ao Serviço Florestal do Brasil, 16 Sept. 1925. Translated in International Yearbook of Agricultural Legislation, 1925, p. 379–390. International Inst. Agr., Rome, 1926.

[7] Law on forests, 21 July 1925. Translated in International Yearbook of Agricultural Legislation, 1925, p. 390–454. Internat. Inst. Agr., Rome, 1926.

owner. Protection forests include two categories: (1) Ordinary conservation zones, which are forest, grazing, or waste lands that should be conserved as a matter of public interest in order to protect the soil on mountains and slopes, to protect springs and streams, to prevent erosion of shores and river banks, and to protect roads, railways, and inhabited places; and (2) compulsory conservation zones in the mountains, where the land is exposed to especial danger of erosion, torrents, and avalanches; and threatens to cause damage to more or less distant localities, arable lands, roads, railways, etc.

In the compulsory zone the authorities may require stabilization of the soil through afforestation or masonry work, and the State may contribute 30 percent of the cost of the work. Owners cannot be compelled to spend money on these lands, but if they do not the State can expropriate the land.

Clearing of the forest and conversion to other use is not allowed in either zone, nor may clear cutting be done. The State may prohibit any cutting, grazing, or removal of litter until a management plan is adopted. Such a plan, covering the utilization of the timber, forage, or other products, may be prepared by the owner or his agent and approved by the Minister of Agriculture and Domains. It must insure the continued productivity of the forest but not necessarily sustained yield. Permission of the State forest officer must be obtained before cutting, and unless application is made before July 1 of each year the owner has to pay the officer's expenses in examining the tract.

If the owners of one half of the forests within a given unit agree, the State may require that small areas of mountain protection forests be grouped into larger units so as to facilitate management. The State is obliged to expropriate the lands of those owners who are unwilling to cooperate and to pool its own forests with the others in the unit for purposes of cooperative management.

The State may remove the inhabitants from protection zones; in such an event it pays their moving expenses, grants them better located cultivable land in exchange, and may also grant cash subsidies to help them get started in the new location.

Nonprotection forests are subject to a less degree of control. Grazing is not permitted in plantations less than 10 years old, in coppice stands less than 2½ feet tall, or on naturally reproducing areas under old timber or on burns. The number of stock that may be run on forest lands is subject to restriction, depending upon the character of the forage. The local population may vote to exclude goats. Night grazing is prohibited, and all stock must be accompanied by a herder. Areas of more than 10 hectares (about 25 acres) may not be cut without the permission of a State forest officer. The State is to supply free planting stock to all classes of owners.

Forests other than protection forests may be subjected to further control at the owners' request. Such forests may be cleared where suitable for agriculture, where they will be restocked artificially, where they are less than 10 hectares in area but not part of larger tracts together containing more than 10 hectares, or in cases where an equal area of other land has been satisfactorily restocked. Plantations under 20 years old may be cleared (except where planted as penalty for deforestation).

CANADA

Neither the Dominion nor the Provincial Governments attempt at the present time to regulate the management of private forests. Such control has been proposed, however, notably in Quebec. There, it is reported, "the Minister of Lands and Forests is urging the adoption of legislation similar to that of the Scandinavian countries * * *. It is hoped to bring about an arrangement under which such owners in Quebec would be forced to secure advance authorization for cutting, and to submit to an official checking of the quantities of timber cut." [8]

CZECHOSLOVAKIA [9]

Almost two thirds of the forest land of Czechoslovakia is privately owned. At least two thirds of the private forest is in large holdings of more than 250 hectares (about 620 acres). Forest legislation is based largely on the Austrian law of 1852. Under a law adopted in 1928, all owners of forests over 50 hectares in area must manage them according to approved management plans prepared by qualified foresters. These plans, which must provide for sustained yield so far as it may be practicable, must specify the quantity and location of cutting for 10 to 20 years ahead and must give details as to the areas to be planted during at least 10 years. Until such plans are approved each cutting must be reported, and it is forbidden to cut more than one sixtieth (regulations specify one eightieth) of the area of high forest or one twentieth of the area of a coppice forest in any one year (except locust or oak grown for tanbark). In no case may the cut exceed the annual growth. Cutting of high forest under 60 years old or coppice under 20 years (with minor exceptions) is prohibited unless such cutting is prescribed in the management plan, or unless special permission is obtained. This does not apply to thinnings or necessary improvement cutting. Owners working under approved plans must keep adequate records and must submit certain reports to the regulatory authorities after the end of each year.

For tracts of less than 500 hectares, the plans must be approved by the local district forest authorities; for tracts of 500 to 5,000 hectares, by the provincial authorities; and for tracts of more than 5,000 hectares, by the Minister of Agriculture. An owner may be required to revise his plan before the expiration of 10 years in case of any important change in the economic situation of the forest, or in case the approved plan is evidently resulting in overcutting. Owners of tracts smaller than 50 hectares may be relieved of the necessity of reporting each cutting if they adopt management plans.

DENMARK [10]

In Denmark, nearly 70 percent of the forest is held by private owners. Almost two thirds of this private forest is in units greater than 60 hectares (about 150 acres). Control over private forests is very slight. As long as an owner keeps his forest in good condition

[8] Frost, Wesley (U.S. Consul General at Montreal), Manuscript report, Oct. 9, 1930.

[9] Deutsche Forstzeitung 43: 786–767 (1928), and 45: 826 (1930).
Loi No. 37 concernant la protection provisoire des forêts, 29 fevrier 1928. In Annuaire International de Legislation Agricole, 1928, p. 346–349. Internatl. Inst. Agr., Rome, 1929.
Décret gouvernmental No. 97 portant exécution de la loi concernant la protection provisoire des forêts 26 juin, 1930. In Annuaire International de Legislation Agricole, 1930. Internatl. Inst. Agr., Rome, 1930.

[10] Koch, A. E., Manuscript on law of Sept. 28, 1805. July 18, 1922. Möller, C. M., "Model forest legislation." In Actes Congrès International de Sylviculture, vol. 2, p. 626–642. Rome, 1926.

he is not interfered with. If he does not do so, the State will carry out such measures as may be necessary to insure restocking, at the owner's expense. Most of the forests are classified as "protected" forests, which may not be cleared. Other forests may be cleared, but must not be devastated so long as they remain forests.

A purchaser may not cut timber, except for his personal use, within 10 years after buying a forest unless he gets permission from Government inspectors and has the trees which are to be cut marked by them (at public expense). This is to prevent speculative purchase for the purpose of exploitation. After 10 years he can cut as he pleases, so long as he keeps the forest productive.

Forests may not be divided into tracts of less than 50 hectares (125 acres) nor may large forest estates be broken up into holdings of less than 600 hectares (1,500 acres). This restriction aims to insure the continued employment of trained foresters, which would not be feasible with small tracts. Owners of less than 50 hectares may form cooperatives and employ foresters, half of whose salaries will be paid by the State.

EL SALVADOR [11]

An owner in El Salvador may not clear a forest for the purpose of cultivating the land without permission of the Departmental Governor; land cleared without permission must be reforested within 2 years. Permission to clear land may not be refused, however, except in case of protection forests, the conservation of which is necessary for the protection of soil on mountains or slopes, prevention of erosion by rivers, lakes, and torrents, stabilizing the flow of springs and streams, fixation of dunes, national defense, and public health. In these forests cutting must be done in such a manner as to maintain a reasonably continuous forest cover, and the trees that are cut must be replaced by others of the same or better kinds within 1 year. Outside of the protection forest areas, every owner of more than 45 hectares (about 110 acres) is required to establish a forest at the rate of 1 hectare for each 50 hectares of land. This is not required where the land is too sterile for trees, or where all of it is utilized for more productive purposes.

ESTONIA [12]

Prior to the war, most of the forests of Estonia were in large estates. Upon the establishment of the Republic all private forests of more than 50 hectares (about 125 acres) in area were confiscated by the State. The remaining private forests are under the general supervision of State forest officers.

FINLAND [13]

More than 60 percent of the forest of Finland is owned by individuals and corporations. Sawmill and pulp companies own considerable areas, but are not allowed to acquire forests within agricultural districts. There are a few large individual holdings, but small

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[11] Ley agraria, 1907.

[12] Mathiesen, A., "Die Waldungen Estlands, ihre Bewirtschaftung und der forstliche Unterricht in Estland." In Actes Congrès International de Sylviculture, vol. 2, p. 32–47. Rome, 1926.

[13] Lakari, O. J., "Measures for insuring sustained forestry in Finland." 26 p. Helsinki, 1926.
Cajander, A. K., "The organization of forest administration in Suomi." Silva Fennica 4: 3–19, 1927.
Loi no. 161 concernant les forêts appartenant aux particuliers, 11 mai 1928. In Annuaire International de Legislation Agricole, 1928, p. 333–338. Internatl. Inst. Agri., Rome, 1929

holdings predominate. Forests must not be devastated or treated in such a manner that natural regeneration is jeopardized. Stands of immature conifer timber may not be cut, but they may be thinned in a rational manner. Where necessary, cut-over areas must be replanted. Clearing of land for crops, pasture, or other use is allowed, provided it is suitable and is actually put to such use. Unless the forest is managed in accordance with a working plan approved by the provincial forestry board, or unless the owner himself is merely making a rational thinning of his woods, the board must be notified before cutting, with information as to time, place, extent, and character of cutting.

Forestry boards (eight in number) consist of 3 to 5 members each, and an equal number of alternates, all appointed for 3-year terms. The members are chosen by the provincial agricultural societies and societies of rural economy, excepting one, who is selected by the central Government office for the promotion of private forestry. Each board has attached to it a provincial forest inspector (and in some instances an assistant inspector) and provincial rangers averaging 6 to 8 in each Province. Each provincial board is assisted by communal boards, each consisting of at least three members elected by the community.

The provincial boards look out for illegal cutting, and advise and instruct the owners as to methods of reforesting cut-over land, including both that newly cut and that already denuded. Forests that have been mismanaged in violation of the law are subject to rather strict regulation by the boards. As originally constituted, the function of these boards was merely to prevent forest devastation, but the law adopted in 1928 made them responsible also for promoting the development of private forestry through dissemination of information, and assistance in forestry operations and cooperative undertakings. This had previously been left to the agricultural societies, under the supervision of the Board of Agriculture.

Protection forests may be so classified by the Government at the request of the State Board of Forestry, where they are near timber line, on drifting sand, or on steep slopes, where the destruction of the forest cover would threaten to cause damage to other land. Timber in protection forests, except for domestic use, may be utilized only with the sanction of a forest official. As most of the forest that falls in this class is State forest, this law has caused no difficulty.

FRANCE [14]

Two thirds of the French forest area is in private ownership, of which more than half is divided among approximately 1,400,000 owners whose holdings are less than 50 hectares each, with an average of about 2½ hectares (6 acres). Less than one tenth of the area is held by the 700 owners of more than 500 hectares (1,250 acres).

[14] Bourdeaux, Henry (editor), "Code forestier, suivi des lois sur la pêche et la chasse et code rural." 384 p., Paris, 1930.
Guyot, Charles, "Manuel de droit forestier à l'usage des particuliers proprietaires de bois." 340 p., Paris, 1921.
Guyot, Charles, "Le reboisement et la conservation des forêts privées." 38 p. Paris, 1920.
Revue des Eaux et Forêts 68: 428; 590; 655. 1930.
Loi relative à la reglementation de l'abatage du chataignier, 6 décembre 1928. In Annuaire International de Legislation Agricole, 1928, p. 338-339. Internatl. Inst. Agr., Rome, 1929.
Anterrieu-Vons, "Organisation du service de defense des forêts, etc." In Actes Congrès International de Sylvieulture, vol. 5, p. 163-184. Rome, 1926.

The "code forestier" adopted in 1827 and amended in 1859, which still applies to most of the privately owned forests, except very small holdings in flat country, places no restrictions on their management except that no forest may be cleared (i.e., deforested) without four months' advance notice to the proper authorities. The forest service, with approval of the Council of State, may prohibit clearing only in cases where conservation of the forest is deemed necessary for maintaining the soil on slopes or mountains, protecting soil against erosion, maintaining the flow of springs and streams, stabilizing of sand dunes and protection of coasts, defense of the frontiers, or public health. Abusive cutting, where subsequent grazing or browsing of the young growth by rabbits may result in deforestation is considered as deforestation and is forbidden. Areas cleared in spite of such prohibition must be reforested within 3 years; if the owner fails to do this work the forest service will do it at his expense. Notice of clearing is not required in case of artificially established forests under 20 years old, groves near dwellings, or tracts of less than 10 hectares that are not contiguous with larger tracts or on ridges or mountain slopes.

Legislation adopted in 1882 and amended in 1913 provides for the designation by law of mountain areas ("perimeters"), within which the public interest requires reforestation and other work for protection of the soil and regulation of streams or torrents. These areas are to be classified only after examination and hearings by a special commission consisting of administrative officials, local citizens, and representatives of the forest service and the highway department. Within these perimeters the Government carries out the necessary work at public expense, expropriating the land if necessary. Owners may retain their lands providing they agree to perform the work and manage the land subsequently as the forest service may direct. In places where conditions are threatening but not sufficiently serious to require restoration work, the service may forbid any utilization of forest or grazing land for a period not to exceed 10 years. The owner is to be indemnified for any loss of revenue, and if the restriction is extended beyond 10 years he may require the Government to buy the land.

A protection forest law of limited scope was adopted in 1922. Under this law protection forests are those which must be conserved in order to maintain the soil on mountains and slopes, and to protect against avalanches, erosion, and the encroachment of waters and sands. After hearings and recommendation by the special commissions provided in the 1882 law, forests may be classified as protection forests upon recommendation of the forest service, in consultation with the secretaries of agriculture and finance, and within the limits of the credits provided in the budget. These forests are subject to special control by the forest service with respect to the utilization of timber, forage, and other products, and are subject to expropriation by the State at any time. Cutting may be done under approved management plans; in the absence of such plans, permission must be obtained for each operation. The owner is entitled to indemnity for loss in revenue resulting from restrictions on management, and he may demand that the State purchase the forest if the loss amounts to one half of his normal revenue. Any silvicultural or engineering work that is necessary to hold the soil in place can be done by the forest service at State expense. As protection of water supplies and regu-

lation of stream flow are not within the scope of this law, the area of private forests affected is very small.

A special law of 1893 applying only to the Maures and Esterel regions of southeastern France restricts the right to use fire on one's own land, and also provides that any owner can oblige his neighbors to cooperate in maintaining a 20 to 50 meter firebreak along property lines.

Another law, passed in 1924, extends the restrictions of the 1893 law to a larger area (Departments of Var and Alpes Maritimes) and provides for the classification by special commissions of districts particularly exposed to fire hazard. If, within 1 year after such classification, the forest owners within a district have not voluntarily joined in a fire protective association, they may be compelled to do so by decree of the Council of State. By 1926, approximately 270,000 hectares had been classified and 10 cooperative associations had been organized. This same law provides that the prefect, upon recommendation of the forest service and the commission, may forbid grazing for 10 years on burned-over land.

Chestnut forests have been subject to special restrictions since 1928. An owner desiring to cut more than 20 trees (except coppice) in 1 year must notify the prefect in advance, must replace each tree that is cut by a new tree or a sprout within 2 years, and may not pasture goats in plantations or sprout stands less than 3 years old.

Optional control is provided in two laws. A law of July 2, 1913, authorizes owners to contract with the forest service to manage their forests under agreements which must run for at least 10 years. The scope of control, to be agreed upon between the owner and the service, may range from mere police protection to complete silvicultural management. The owner is to pay a fee for this service. It has been reported that the fees demanded by the forest service have been so high that very few owners have taken advantage of the law. Another law passed in 1930 provides for a reduction of the transfer tax on forest lands on condition that they shall be managed according to a working plan approved by the local office of the forest service. As an alternative, if the forest is more than 50 hectares in area, the owner must get the permission of the forest office before cutting, must replant within 5 years if natural reproduction fails, and must also prevent damage from grazing and wild game. These restrictions are to be effective for at least 30 years after the transfer of ownership.

ALGERIA [15]

Only 5 per cent of the Algerian forest is privately owned. The laws relating to use of private forests are patterned closely after the forest code of France. The forest service may forbid clearing (deforestation) where the preservation of the forest is necessary for the protection of soil on mountains or slopes, prevention of erosion by rivers or torrents, stabilization of streams, fixation of drifting sands, national defense, or public health. Areas cleared without permission of the forest service must be reforested within 3 years. If the owner fails to do this, the service will do it at his expense.

Brush-covered or denuded land which needs to be forested for the same reasons may be declared to be of public utility and may be

[15] Loi forestiere relative à l'Algérie, promulguée le 21 fevrier 1903, also supplementary decree of the Governor General, dated Aug. 20, 1904.

expropriated for purposes of afforestation, at the option of the forest service. If the land is not expropriated, the owners may continue to use it, but may not clear the brush or trees without permission of the service.

Abusive exploitation or overgrazing which will result in the destruction of the forest is considered equivalent to deforestation. Grazing on reproducing burns less than 6 years old is prohibited.

Except for the restriction on clearing, owners may manage their forests as they please, but with certain exceptions they must give notice before cutting timber or harvesting other products. Except where it is proposed to clear the land, this is merely to allow the authorities to check up the ownership of the forest and thus prevent trespass.

Burning of brush and slash near forests requires a permit and may be done only if a forest guard is present. An owner of land that is covered with brush or slash may be required by owners of adjoining land to cooperate in clearing a firebreak around his property.

MADAGASCAR [16]

Proprietors enjoy full rights of ownership and use of their forests in Madagascar except that they may not destroy the forest without permission of the Governor General, and must not use fire to clear the land. Permission to clear may be withheld where the conservation of the brush or forest cover is necessary for protection of soil on mountains or slopes, prevention of erosion by streams and torrents, protection of springs and headwaters of streams, stabilization of dunes and seacoasts, or for purposes of public health or national defense.

An owner or operator clearing land without authorization may be compelled to reforest it under the direction of the public authorities at a rate not to exceed 25 hectares a year.

Recent legislation (1930) provides for classification of special "protection forests" and "reforestation reserves". Protection forests which include all forests on lateritic soil with slopes steeper than 35°, may not be exploited without permission of the forest service and not more than 50 percent of the trees may be cut. Reforestation reserves are temporarily closed to all exploitation. They include bare or insufficiently wooded land on steep mountain slopes, littoral dunes, or lands liable to serious gullying, and also isolated forests of less than 500 hectares unless exempted by the forest service.

GERMANY [17]

In Germany, legislation on forestry matters has been left to the individual States. Since the revolution of 1918 a national forestry law has been proposed and widely discussed, but it has not yet been adopted. In order to clear up any doubts as to the authority of the States to regulate private forests, an ordinance was passed in 1924 specifically confirming this authority, subject only to the restriction

[16] Decree of 1913 establishing régime forestier for the colony.
Décret réorganizant le régime forestier applicable à Madagascar et dépendances 25 janvier 1930. In Annuaire International de Legislation Agricole, 1930, p. 533–542. Internatl. Inst. Agr., Rome, 1930.

[17] Von Arnswaldt, in Allgemeine Forst- und Jagdzeitung 105: 298–306, 1929.
See also Weber, H., Forstpolitik, Ch. XIX, in Handbuch der Forstwissenschaft Ed. 4, Bd. 4. Tübingen, 1927.

that an owner must be allowed to manage his forest in his own way, provided he keeps within the limits of "conservative forestry". As each State decides for itself, what constitutes "conservative forestry", practically any degree of control may be adopted. In some of the States the old forest laws are still in force; others have adopted new laws, providing for an extension of public regulation beyond that previously in effect.

The essential provisions of the laws of the principal German states are as follows:

BADEN [18]

One third of the forest in Baden is privately owned. Three fourths of this is in tracts of less than 20 hectares. Only 44 properties are larger than 100 hectares, having an aggregate area of 7,000 hectares, (approximately 17,300 acres). An owner may use his forest as he pleases, so far as this does not interfere with the obligation to maintain it as continuously productive forest. Management on a sustained yield basis is not required. In order to insure that the forest will be continuously productive, deforestation without permission of the State forest service is forbidden, as is also the destruction or jeopardizing of the forest through mismanagement. Where clearing is permitted, the land must be put to agricultural use within a specified period. Permission to clear will not be granted if there are valid objections by neighboring owners, or if the land is not suited for agriculture.

Clear cutting (or its equivalent) requires the consent of the local authority; consent is to be refused unless the applicant agrees to plant the area as directed by the district forest office and unless the success of artificial restocking is reasonably certain.

All plantable forest land which will not become fully stocked naturally must be planted. This includes land already denuded before the law was passed. The district forest office is to see that sufficient planting stock is grown, preferably in the private forests themselves, or, if necessary, by public authorities, and that it is sold at low prices. In case an owner fails to do the required planting at the time and in the way specified, the State forest authorities are to do it at his expense.

If he destroys the forest or utilizes it in a way that threatens to destroy it, his operations may be stopped, he may be fined, and the forest may be put under control of a State forest officer for not less than 10 years. On such a forest the owner must notify the forester by April of the kind and quantity of timber he desires to cut in the succeeding fiscal year. The forester marks the timber to be cut, instructs the owner in methods of felling and removing the timber and by products, and inspects the cutting area to see that his instructions are carried out.

Cutting or hauling of timber at night is forbidden, as is night grazing. The erection of buildings in or near forests, and the burning of charcoal or use of fire for other purposes are subject to restrictions. Forest properties of less than 20 hectares may not be subdivided except by permission of the authorities.

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[18] Muncke, Th. (editor), Das Badische Forstgesetz in seiner jetzigen Gestalt. (Law of 1833 as amended in 1854, and supplementary ordinance of January 30, 1855.) Karlsruhe, 1874.
Eichhorn, Das badische Forstgesetz und seine Erneuerung. Allgemeine Forst- und Jagdzeitung 105: 441–454. 1929.

BAVARIA [19]

About half of the forest in Bavaria is privately owned. Most of the private forest is in small units. Only one fifth of it is managed by foresters. Every owner is entitled to the free use and management of his forests so long as the rights of other parties are not infringed upon, and so long as he complies with the provisions of the forestry law which are designed to insure the maintenance of the forest in a productive condition.

Protection forests include those on ridges, steep slopes, hillsides, and bluffs, those affording protection against avalanches and winds, and those serving to maintain the flow of springs, to prevent the erosion of stream banks, and to fix drifting sands. Such forests may not be destroyed or even clear cut.

Other forests may be cleared only with the permission of the forest authority, provided the land is unquestionably suited for agriculture or other superior use, and provided the owner agrees to put it to such use within a period to be specified. Land devoted to forests must be kept forested and may not be devastated; that is, it may not be handled in such a way as to threaten its continued existence as a forest. Clear cutting is not considered as devastation, provided the land is restocked promptly by natural or artificial means. Areas denuded by cutting or through any other cause following the adoption of the law must be reforested, by planting if necessary. If the owner fails to do this within a specified time, the State foresters will do it at his expense. When forest land or standing timber is sold, the authorities must be notified and a permit obtained before the timber is cut. This may be refused unless reforestation is assured. It may be refused in case of young high-forest stands if less than 75 percent of the trees are 12 centimeters or more in diameter.

Grazing at night or on areas occupied by young growth is forbidden, and livestock must be accompanied by a herder. The use of fire and the erection of buildings in or near a forest are subject to limited control. The owner must carry out such measures as may be required by the authorities in case of insect outbreaks.

A private forest may be subdivided only with the consent of the forest authorities, and in no event may it be subdivided to such an extent that the separate portions are incapable of regular management.

HESSE [20]

Less than one third of the Hessian forest is privately owned. Two classes of private forests are distinguished: Class I forests (about 70 percent of the total), managed by technically trained foresters; and class II forests, which are not so managed. Class I forests do not have to pay the special forest protection tax which is collected from owners of class II forests. All forests must be kept continuously productive, and their yields increased so far as practicable. For clearing of forest land, the permission of a superior forest official is required. Bare land that is suitable for forestry and unused for crops or pasture must be

[19] Ganghofer, A. Von, "Das Forstgesetz für das Königreich Bayern." Ed. 2, 381 p. Nordlingen, 1889.
Weber, H., "Forstpolitik," Ch. XIX, in Handbuch der Forstwissenschaft, Ed. 4, Bd. 4. Tübingen, 1927.

[20] Endres, M., "Handbuch der Forstpolitik." Ed. 2, p. 176–178. Berlin, 1922.
Weber, H., "Forstpolitik," Ch. XIX, p. 365–367, in Handbuch der Forstwissenschaft, Ed. 4, Bd. 4. Tübingen, 1927.

reforested within a period to be fixed by the forest authorities. Private forests, or public and private forests together, may be combined into cooperative units and managed by the State forest service, upon request of the owners. Individual owners also may have their forests managed by the State, under voluntary contract.

A forest or the standing timber may not be sold without permission of the forest authority, and the State has prior option on any forest that is offered for sale. It is not permitted to break up forest properties so as to make units of less than one half hectare. Protection forests must be handled in accordance with an approved management plan and qualified foresters must be employed.

MECKLENBURG-SCHWERIN [21]

Private owners in this State hold slightly less than half of the forest area. Forest devastation is forbidden, and forest land may not be cleared for other use without permission of the forest authorities. Not to exceed 4 percent of the area of a forest of 25 to 100 hectares may be cut over in any one year. For a forest of more than 100 hectares not more than 2 percent of the area may be cut in any one year, the forest must be managed according to a working plan, and technically qualified foresters must be employed.

Areas on which the volume of timber has been reduced below 40 percent of the original stand, by cutting, fire, or otherwise, must be reforested within three years. If the owner fails to do this, the public authorities will do it at his expense. Existing bare land must be planted within a period to be fixed, and the State will contribute part of the necessary funds for this work. The dividing of forests is forbidden, except as may be allowed by a later law. Forests which serve as recreation spots for people in the cities may not be cut without permission of a special commission which is set up for the purpose.

The supervisory authority is the Agricultural Chamber, working through its forestry committee, which consists of forest owners, representatives of the communal forests, the small owners, and the professional foresters. Appeals from decisions of the Chamber may be taken to the State Department of Agriculture, Domains, and Forests.

PRUSSIA [22]

Half of the forest in Prussia is privately owned. Mandatory control applies only to protection forests, which are those protecting other forests or watercourses from drifting sand, protecting lowlands, roads or buildings against floods or landslides, protecting against winds, or protecting the flow of streams. In these forests, methods of cutting may be prescribed, and planting or other control work required. A special law applying to the headwaters of the Oder, in Silesia, forbids excessive removal of litter, grazing, removal of stumps, or digging of drainage ditches.

Forests may be classified as protection forests upon application of communes, local or district authorities, interested persons who are exposed to danger, or the State police authorities. Forest owners are

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[21] Allgemeine Forst- und Jagdzeitung 105: 298-306. 1929.

[22] Manuscript report on law of July 6, 1875.
Allgemeine Forst- und Jagdzeitung 105: 298-306. 1929.
Deutsche Forstzeitung 47: 654-655. 1932.
Weber, H., "Forstpolitik," ch. XIX, p. 415, in Handbuch der Forstwissenschaft, Ed. 4, Bd. 4. Tübingen, 1927.

to be compensated for losses suffered as a result of restrictions, at the expense of the applicants or other persons benefiting from the restriction. Beneficiaries may be required to pay for the construction and maintenance of protection works. Restrictions may not be imposed which will entail a greater loss than the amount of damage that will be prevented.

A 1922 law provides for the preservation of stands of trees near large cities and health resorts, or in industrial districts. Restrictions will be removed in 1937 if interested municipalities or associations do not lease or purchase the forests by that time.

New legislation has been under discussion for several years, but has not yet been adopted. This contemplates extension of public control to all private forests, under the general supervision of a special State forest commission assisted by provincial commissions. Working plans would be required for all forests above a given minimum area, clearing without a permit would be prohibited, and reforestation of cut-over land would be obligatory.

SAXONY [23]

In this State almost half of the forest is privately owned. Three fourths of the private forest is in small units, which for the most part are poorly managed. The average private holding is only 5 hectares in extent. Advance notice of proposed cutting must be given to the State forest service. Certain restrictions are imposed on the cutting of immature timber. Decisions of forest inspectors are subject to review by a central board, which includes representatives of the State forest service and of communal and private forest owners. Bare forest lands must be reforested at an early date, under general supervision of the State foresters. Intervention in the management of well-kept private forests is not contemplated.

THURINGIA [24]

About half of the forest in Thuringia is privately owned. The forest law of 1930 requires that all forests, regardless of ownership, must be managed conservatively. For clearing forest land, permission of the forest authorities must be obtained, and advance notice must be given of any clear cutting in excess of one half hectare (about 1¼ acres), unless it is done under an approved working plan. The owner of a forest over a minimum size to be fixed by the Finance Department must employ a qualified forester and a protective force, or be a member of a silvicultural association, or put his forest under the control of the central agricultural chamber (Hauptlandwirtschaftskammer). At the owner's request, the State will take over the management and protection of any forest, for a stipulated fee to be paid by the owner. The cutting and sale of timber is left to the owner. Under certain conditions forests may be classified as protection forests, and then their management is subject to a greater degree of public control.

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[23] Steger, C. T. (United States vice consul), Manuscript report on law of October 25, 1923. (Dec. 14, 1923.)
[24] Deutsche Forstzeitung 45 : 1119–1120. 1930.

WURTTEMBERG [25]

Only one third of the forest is in private ownership in Wurttemberg. Clearing of forest land (deforestation) requires the permission of the Department of Finance, following a recommendation of the forest service. Permission will not be granted where the clearing will break up a contiguous forest unit or will endanger adjoining forests, or for forests on heights or those which afford protection against wind. Permission to cut clear or to thin heavily may also be withheld where the forest officer determines that the forest should be kept intact in order to prevent damage through landslides, soil washing, or windthrow of adjacent conifer forests.

Forest officers may require the modification of cutting and other practices, including excessive grazing and removal of litter, which endanger the continued existence of the forest. The owner must give notice of outbreaks of insect and other pests and must carry out control measures as directed.

Bare land suitable for timber production (whether denuded by the owner or not) must be restocked within a specified period; if it is not, the work will be done by public agencies at the owner's expense.

The owners of small tracts may combine them for purposes of management, and may arrange with the State forest service to provide technical supervision and protection. The owners are to pay an agreed sum for this service.

GREAT BRITAIN

Neither in Great Britain itself nor, with one or two minor exceptions, in other parts of the British Empire has the Government undertaken to exercise any control over the management of privately owned forests. The necessity for some degree of control is coming to be recognized, however, particularly since the World War. The report of the Third British Empire Forestry Conference (1928) contains the following statement:

> It is suggested that legislation might provide for the protection of water sources and the prevention of erosion and shifting cultivation, matters which the discussions show to be of prime importance in many countries. Similarly, it was thought that governments who have not hitherto done so, might in certain circumstances take power to assume, on conditions, the management of private forests in the public interest.[26]

The annual report of the Forestry Commission of Great Britain for 1929 contains the following:

> The measures which the commissioners have taken to improve private forestry consist of provision of grants for planting, technical advice as to the conduct of operations and educational facilities, the conduct of research and the dissemination of information. These activities * * * have not been successful in arresting the deterioration of the home woodlands in private ownership, much less in restoring the pre-war position.
>
> There are three main lines of action to which recourse is possible: (1) State assistance * * *; (2) restrictions on the user of woodlands, such as State permission to fell or compulsory replanting * * *; (3) acquisition and replanting by the State of felled and derelict woodland. This procedure has already been applied by the commissioners, but purely on a voluntary basis.
>
> In reviewing the whole situation with regard to private forestry the commissioners have come to the conclusion that while they do not suggest any immediate

[25] Forstpolizeigesetz vom 19 February 1902 (and supplementary instructions of July 30, 1902).

[26] Third British Empire Forestry Conference, 1928, Summary Report, Resolutions, and Reports of Committees, p. 7.

changes, it may become necessary in due course to ask Parliament for additional powers.[27]

GREECE[28]

Private owners control slightly more than one fifth of the forest area of Greece. The forest code adopted in 1929 gives the state a general right to supervise the administration and exploitation of private forests. These must be handled in accordance with management plans prepared by trained foresters and approved by the Minister of Agriculture upon recommendation of the Council of Forests, an advisory body composed of Government officials, technical foresters, and representatives of forest owners and industries. These plans must be revised at least once every 10 years. Owners of small tracts may form cooperatives for the protection, management, or exploitation of their forests, and such cooperation may be required if one third to one half of the owners in a given unit so request.

Protection forests, to be classified by the forest service upon application by local officials or interested parties, include forest, pasture, or cultivable land on which the public interest requires that a forest cover be maintained to protect the soil on slopes, to protect land lying below from snow and earth slides and soil washing, to protect land from floods, coastal erosion, or drifting sand, or to protect the shores of lakes and streams, roads, railroads, habitations, monuments, and historical spots. Any cutting in protection forests which denudes the land or jeopardizes its continuous productivity is prohibited, and the Minister of Agriculture, with approval of the council, may forbid any cutting, cultivation, or grazing. In general, selective cutting is allowed, after due notice, and in coppice forests small areas may be clear cut. Cutting of trees around sacred, historical, or artistic sites is prohibited, except as partial cutting may be authorized by the Minister. Owners cannot be compelled to undertake improvement works at their own expense, but if such work is deemed necessary and the owners are unwilling to do it, the state may expropriate the land.

With the approval of the local forestry commission and the Council of Forests, the Department of Agriculture may classify land as in need of reforestation or afforestation. This includes land with scanty or no natural tree growth which should be forested for the reasons enumerated above, as well as land bordering highways and railroads. Owners of large estates (over 3,000 stremma, or 300 hectares) may be required to afforest up to 15 percent of their land, depending on its character. The forest service furnishes seed and plants at low prices for planting classified lands, and may do the planting in case an owner refuses. In that case the owner is required to pay the same royalty when timber is cut as though it were on a state forest. Clearing, cultivation, or grazing of these lands is forbidden, except that a limited amount of grazing may be permitted by the Minister of Agriculture.

Owners may be required to construct and maintain firebreaks around forests that are especially subject to fire, and owners of pine forests may be required to adopt other preventive measures, such as thinning or pruning the stands. Fires may not be built in or near forests between May 1 and September 30 unless proper precautions are taken. Cost of extinguishing fires on private land is to be collected

[27] Tenth annual report of the forestry commissioners for the year ending Sept. 30, 1929, p. 30–31.

[28] Loi No. 4173 sur la sanction et modification du décret-loi du mai 1929 "sur le code forestier", 17 juin 1929. In Annuaire International de Legislation Agricole 1929. Internatl. Inst. Agr., Rome, 1930.

from the owners. The timber in burned forests may not be exploited for 5 years after the fire, nor may the land be cultivated for 10 years, if the owner was responsible for the fire or failed to take suitable measures to prevent and suppress it. After a fire, sheep, cattle, or horses may not be pastured on the burned forest land, whether reforested or not, for 5 years, nor goats for 15 years.

GUATEMALA [29]

Forests at the headwaters of publicly used springs and streams in Guatemala may be declared to be of public utility, and are then subject to control. Other forests may be put under control of the forest department if the owners request it.

Strips at least 275 feet wide must be left uncut along crests and ridges; forests on high lands or slopes may not be cleared where this will result in landslides or washing of the soil that will jeopardize the life or property of others; nor may forests be cut above or within 100 meters of springs belonging to other owners. For each tree cut in the pine and coffee regions, three trees of the same species, or five of some other valuable species, must be planted in the same year at the beginning of the rainy season; if the planting does not succeed, it must be repeated under the supervision of forest agents. The local magistrate and neighboring owners must be notified before land is burned over.

HUNGARY [30]

Two thirds of the forest in Hungary is privately owned. The forest law of 1879 and later amendments prohibited deforestation of "absolute forest soil", regardless of its ownership. Mountain forests which should be preserved for their protective functions were to be classified by a special commission within five years after adoption of the law. Clear cutting is not allowed in protection forests, and they must be managed according to management plans approved by the forest department. Grazing on ravine lands liable to erosion is subject to certain restrictions.

Industrial corporations owning forests must follow approved management plans and employ trained foresters. Under a law adopted in 1918 private forests which are not handled under such plans are subject to public control, and must be kept productive.

New forest legislation was under discussion in 1930.

IRISH FREE STATE [31]

Private owners hold four fifths of the forest area of the Irish Free State. Restrictive legislation is based on the public interest in preserving the amenity values of trees and woodland, rather than on protection of soil or water resources.

An owner must notify the authorities three weeks before cutting trees that are more than 10 years old. The Minister of Agriculture may prohibit cutting unless replanting of the same or an equivalent area within 12 months is assured. The State may subsidize planting

[29] Ley forestal approved by Legislative Assembly Mar. 24, 1925. In El Guatemalteco, Apr. 16, 1925.
[30] Fernow, B. E. A Brief History of Forestry, pp. 181–182. Cambridge, Mass., 1911.
Commission du Régime des Eaux du Danube, 8th session, Avril, 1925, Protocoles, p. 45.
[31] Quarterly Journal of Forestry 24: 207–208.
Saorstát Eireann, Forestry Act (Acht Foraoiseachta). 1928.

up to £4 an acre. Cutting may be prohibited altogether where it is desirable to reserve the trees for scenic reasons, in which case the owner is to be compensated. The Minister has the power to buy out any grazing rights or rights to dig turf which may interfere with forest conservation. General permits, which may be issued for definite periods, may allow cutting that is in accordance with good forest practice.

ITALY [32]

State intervention in the handling of private forests in Italy is justified chiefly on the grounds of public welfare involved in the protection of soil and control of water. Three fifths of the Italian forests are privately owned, mostly in small tracts. In general, owners are not required to give notice or to obtain permission for ordinary cutting in their forests, nor are they obliged to follow management plans. They may not, however, clear forest land for another form of use without the permission of the provincial forest organization. If a forest is being utilized in a manner which threatens its existence, the forest authorities (forest militia) may prescribe the method of use or suspend exploitation altogether.

The 1923 law provides for a forest commission in each province consisting of the forest inspector or his deputy, a civil engineer, an agricultural expert, and an expert on mountain problems chosen by the Minister of National Economy, two members nominated by the provincial council, and a special representative from each commune to sit with the commission when dealing with matters affecting his own commune.

Lands where the destruction of the forest, brush, or other cover will lead to erosion of the soil or will disturb the flow of streams, to the injury of the public, are to be classified by the commissions, upon application of the forest service or other interested party, as protected or ban forests. Such land may be cleared for cultivation or other use only with the consent of the forest militia, and in the manner prescribed by it. When the clearing of mountain land is permitted, the slope must be reduced to not more than 20 percent by means of terracing, and canals must be built to carry off the surface drainage without washing. The method of using the timber and forage is also to be prescribed, including season and method of cutting, length of coppice rotation, use and control of fire, control of insects, and time and intensity of grazing. An owner must notify the forest authorities in case of insect or disease outbreak threatening to destroy his own forest or to spread to other forests. Goats may not be grazed on protected areas, nor any stock on reproduction areas until the young trees are old enough to escape injury, nor in poorly stocked forests until reproduction is assured. Where it is necessary for the revegetation or stabilization of the soil of protected areas, all grazing may be suspended for a maximum period of 10 years. Any diminution of revenue is to be allowed for in assessing the land for taxation.

Forests which protect land or buildings from avalanches, falling rocks, drifting sand, and winds; or those which should be preserved for

[32] Riordinamento e riforma della legislazione in materia di boschi e di terreni montani, Regio decreto, 30 dicembre 1923, no. 3267. Liberia dello Stato, Rome, 1924. Also amendment in Regio decreto-legge, 3 gennaio 1926, no. 23.

Merendi, Ariberto, manuscript report in files of Forest Service. 1932.

Paillié, M., "Rapport sur l'intervention de l'Etat dans la gestion des forêts particulières d'après quelques législations récentes." In Actes Congrès Internationale de Sylviculture, vol. 3, pp. 32–53. Rome, 1926.

hygienic reasons or for the national defense are also to be classified as protected forests when requested by the provinces, communes, interested private parties, or the appropriate Government departments. Such forests may not be cleared. Those benefiting from restrictions on the use of such forests must indemnify the owners for any loss of revenue that they may sustain by reason of the restriction.

The state, through the Ministers of National Economy and Public Works, can select watersheds needing control work (reforestation or engineering) and carry out such work; the owner is to be indemnified for any loss of income. After the work is completed the land is to be returned to the owner, but will remain subject to restrictions on its use. Land that has been reforested must be kept in forest and handled in accordance with an approved management plan, and may not be grazed until the young growth is beyond the risk of danger. In case the owner is unwilling to accept these restrictions the state is authorized to buy the land. The owners themselves may carry out the necessary control work, on the basis of an approved plan, and may be reimbursed by the State for their expenditures. The forest service, provinces, or communes may also temporarily or permanently expropriate lands within the protected zones, in order to afforest them, improve existing forests, or stabilize dunes.

Associations may be formed for the reforestation of protected areas. If such an association represents four-fifths of the area to be reforested, it may expropriate the lands of remaining owners who are unwilling to join. These owners must be bought out if they demand it.

Any owner afforesting brush, grass, or denuded land under the supervision of the forest authorities is entitled to certain tax exemptions, and if it is in a protected area the State will provide free technical supervision, free seed or plants, and will pay up to two thirds of the cost of the work.

JAPAN [33]

The maintenance of a forest cover in the mountains is especially important in Japan, because of the steep topography, with soils and rock particularly susceptible to erosion, and the heavy rainfall. Regular flow of the rivers is desirable because of their extensive use for power and irrigation. Forty percent of the forest is privately owned.

The local governor may prescribe the method of working (including gathering of litter, etc.) in private forests which are threatened with destruction, and may stop operations and order the reforestation of cut-over areas where such instructions are not complied with. He may also order the reforestation of land denuded before the law was passed. If the owner fails to plant when ordered to do so, it is to be done at his expense by public agencies.

It is forbidden to burn over forest or wild land without a permit and without prior notice to owners or managers of neighboring forests. Owners must combat insect outbreaks.

Protection forests are to be classified by the competent Minister in accordance with the recommendations of the local forest commission, upon application of a municipality, a local authority, or other directly interested party. These are forests which are neces-

[33] Forest Act of Japan. Act 43, Apr. 23, 1907, revised by Act 75, June 1911. Department of Forestry, Tokyo, 1926.

sary for protection against soil denudation, drifting sand, flood or wind damage, avalanches or rock slides, for the regulation of water supplies, the protection of fisheries or the public health, the guidance of navigators, or the protection of scenic beauties at shrines, temples, or historical sites.

No one may cut timber, gather by-products, or graze stock in protection forests without the permission of the local governor, who may prescribe the methods of utilizing the forest and may stop cutting altogether for a period of one year. An owner is entitled to compensation from the Government for any direct loss resulting from restrictions, including the cost of any reforestation that he may be required to undertake. The Government may reimburse itself through assessments against those who benefit from the restrictions.

Cooperative societies may be formed for the purpose of undertaking to prevent forest devastation, to restore devastated forests, or to maintain the safety of the land. Two thirds of the owners, representing at least two thirds of the area involved, must give their consent. These cooperatives are under the control of the competent Minister and the local governor.

LATVIA [34]

Only about 15 per cent of the forest in Latvia is privately owned. All forests of more than 50 hectares (about 125 acres) are subject to the forestry law, which provides that cutting must follow the established rules of sound forest management. In the case of forests which serve to prevent drifting of sand or which should be preserved for esthetic reasons, cutting is subject to special restrictions and may be prohibited altogether.

LUXEMBURG [35]

Private forests in Luxemburg are free from restrictions except that clearing on slopes of more than 35 degrees requires a permit. This may not be refused if the area is suitable for building purposes, mining, or grape growing, or if the timber stand is less than 20 years old, or is adjacent to a dwelling.

MEXICO [36]

No cutting is allowed in private forests in Mexico without the consent of the Department of Agriculture, which may establish regulations governing such cutting. Timber must be cut with a saw, not with an axe. All owners or managers must take the necessary precautions to avoid starting fires, must extinguish those on their own land, and must assist in extinguishing those on neighboring property. No exploitation will be authorized until a plan for reforestation has been submitted. Individuals or organizations exploiting communal, municipal, or private forests must carry out artificial reforestation: (1) Wherever natural reforestation will not take place, in the judgment of the local forest inspector; (2) where repeated coppicing has resulted in marked degeneration of the forest;

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[34] Teikmanis, André, The Timber Problem. In League of Nations Economic Committee report. Geneva, 1932.

[35] Endres, Forstpolitik. Ed. 2, p. 220. 1922.

[36] Ley forestal, Apr. 5, 1926. Diario Oficial no. 45, Apr. 24, 1926. Translated in International Yearbook of Agricultural Legislation, 1926, p. 202–206. Internatl. Inst. of Agr., Rome, 1927.

See also supplementary executive decree of May 6, 1932, on reforestation, in Mexico Forestal 10:78–79. 1932.

(3) when a stand is clear cut and the land is not to be cultivated; or (4) when the total cut exceeds 2,500 cubic meters of logs in the temperate belt or 1,000 cubic meters in the tropical belt. The trees that are cut must be replaced by trees of the same or better kinds.

The department may at any time order owners to restore vegetation destroyed by artificial or natural causes. If the owners are unable to do this, the department is to help them. If the executive (through the department) believes that certain lands should be afforested because of their location or for topographic or hydrological reasons, or for any other cause, it may order such work to be done under penalty of expropriation of the land. The Federal Government or the States may expropriate private woodland or bare land for forest reserves, for reasons of public utility.

All wood-using industries must utilize wood completely, without waste. Timber used for posts, mine props, and other uses where frequent renewal is necessary must be treated with preservatives.

NETHERLANDS [37]

Although more than 80 percent of the forest land of the Netherlands is privately owned, there are very few restrictions on its management. In order to prevent serious forest insect infestations, unpeeled conifer logs may not be left in the woods between May 15 and August 1. An owner must take reasonable precautions to prevent the spread of fires caused by railroads or tramroads. Those who do not take such precautions are not entitled to collect damages from the railroad or tramroad company causing a fire.

A recent law (1928) provides for reduction in taxation of forest property having especial scenic or recreational value, provided the public is allowed access to it. Land that comes under this law is to be subject to sufficient public control to safeguard its scenic value, and an owner must notify the forest service before cutting timber.

The state, or a municipality, or a recognized foundation incorporated for the preservation of natural beauty may expropriate forests in order to protect the beauties of nature, and cutting in such forests may be forbidden pending expropriation.

NORWAY [38]

Nearly 80 percent of the productive forest area of Norway is privately owned, and 70 percent is owned by farmers.

The township (herred) councils or individual parishes may, by resolution ratified by the King, adopt regulations for preventing the destruction of private forests within their respective territories, except those on homesteads (farm wood lots). These regulations may cover the methods of cutting and managing the forests, except that clearing shall be allowed where the land is to be used for gardens,

[37] Boschwet 1922—Wet van den 19den Mei, 1922, houdende bepalingen betreffende den boschbouw. Staatsblad van het koninkrijk der Nederlanden.

Van Dissel, E. (Director of State Forest Administration of the Netherlands), manuscript report in files U.S. Forest Service. January 1932.

[38] Lov av 7 juni 1916 om tillaeg til lov om vernskogens bevarelse og mot skogens ødelaeggelse m.v. 8 august 1908. Also Law of August 8, 1908, on preservation of protection forests and prevention of forest destruction. (Translations by S. T. Dana.)

Lov nr. 4 om forandring i lov om vernskogens bevarelse og mot skogens ødeleggelse m.v. av August 1908—6 juin 1930. *In* Annuaire International de Legislation Agricole. 1930. Internatl. Inst. Agr., Rome, 1930.

Nieuwejaar, Otto, "Norwegian laws concerning protection forests and the prevention of forest destruction." Journal of Forestry 29: 87–91. 1931

crops, meadows, buildings, roads, etc. Restrictions on grazing seasons, incorporated in an earlier law, are no longer provided. The regulations may distinguish between commercial cutting and that for domestic use; owners or users may be required to utilize dead trees and other waste material before cutting green trees; burning of brush land may be forbidden except with the approval of the forest inspectors. Owners may be required to deposit a cash guarantee that the area will be restocked in case of cutting for sale or for industrial use; this is deposited in a savings bank and returned to the owner with interest after the reproduction has become well established.

The governing councils of the townships or the parishes, as the case may be, may appoint township or parish forest boards consisting of five residents, at least three of whom shall be forest owners. These boards (or the councils if no boards are appointed) issue instructions and supervise the enforcement of the law and regulations. They appoint forest inspectors or rangers, who are paid half by the township or parish, and half by the state if the regulations and provision for their enforcement are approved by the state forest service.

A supplementary law of 1916 applies to all parishes which had not already adopted regulations for private forests. This forbids the cutting for commercial purposes or industrial use of conifers under 20 centimeters (approximately 8 inches) in diameter, except that suppressed or unthrifty trees or others which should be removed for the good of the forest may be cut after being marked by a state or county forester. The forest board must be notified at least 14 days before cutting any trees for sale or industrial use. Leaving of seed trees may also be required.

Under the 1908 law, as amended in 1930, protection forests may be classified by the forest service, acting in collaboration with a commission of three members, two of whom must be forest owners. Such forests may be those protecting against landslides, floods, drifting sand, or those necessary for the protection of an adjoining forest or cultivated land, or those which, because of their situation (high altitude, latitude, proximity to the coast, etc.), would become devastated if heavily cut or otherwise misused. Boundaries of such forests must be marked. Provisions for the protection of these forests are to be drawn up in each case by the forester of the district or by a forester appointed by the forest service, and must be agreed to by the county or township commission (see above) and ratified by the King. No timber may be cut in protection forests except in a manner prescribed by the forest service; upon request by the owner the trees to be cut will be marked by the forester in charge.

PERU [39]

Most of the forest land of Peru is still in public ownership. The only public control over private forests is the requirement that permission must be obtained before cutting timber near the seacoasts or in the mountains within 20 kilometers of railroads.

[39] Executive decree of Dec. 30, 1919.

POLAND [40]

Two thirds of the forest area of Poland is privately owned, and two thirds of the private forest is in fairly large holdings.

Forest land may not be cleared for other use without special permission. Nonprotection forests of less than 5 to 10 hectares, depending on the province, are not subject to this restriction unless they are contiguous to larger tracts. Forests that are clear cut or denuded in any other manner must be reforested artificially within three years unless natural regeneration is assured.

All forests must be managed under approved working plans on a sustained yield basis, and no cutting (except to salvage dead or down material) may be done that is not provided in the plan. Grazing is prohibited in stands less than 15 years old or less than 3 feet tall.

The owner must notify the authorities of insect outbreaks and must use reasonable effort to combat them.

Protection forests (classified by the forest service upon its own initiative or upon the petition of interested parties) are those deemed essential for preventing erosion, loss of soil fertility, land or rock slides, washing of stream banks, drifting sand, or formation of torrents, and those important for the national defense or for scientific purposes. Such forests may not be destroyed in order to make other use of the land. The methods of cutting and grazing are subject to the general control of the forest service and the direct control of the district and provincial administrative councils.

PORTUGAL [41]

Private forests in Portugal, if located within zones which have been declared to be of public utility, are subject to public control on the ground that a forest cover is necessary in order to regularize the flow of streams, prevent flood damage to the lowlands, protect ridges and waste lands, ameliorate the climate, or fix and conserve the soil in mountain regions and coastal dunes. This classification is made by the Minister of Agriculture, with the advice of the forestry section of the Superior Council of Agriculture.

The State polices these forests, helps in drawing up working plans, provides free seed and planting stock and technical direction of planting operations, and exempts plantations of more than 1 hectare from property taxes for 20 years.

The owners of classified forests must manage them according to working plans approved by the forest service, must employ a forest guard for each 500 hectares (about 1,250 acres) of forest in flat country or 350 hectares (875 acres) in the mountains (or share the cost with the State where small properties are situated close to State forests), and must report all sales, leases, or exchanges of land or timber within 30 days. The customary methods of exploitation are allowed, but the land may not be clear cut or the stumps removed unless the whole area is to be immediately reforested by sowing or planting.

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[40] Revue des Eaux et Forêts 68: 393. 1930.
Deutsche Forstzeitung 45: 116–117. 1930.
Annuaire International de Législation agricole 1927, p. 122. Internatl. Inst. Agr., Rome, 1928.
Swinarski, Teodor, "Der Schutz der Privatforsten in Polen." Vierteljahrshefte der Polnischen Landwirtschaft 1: 58–77. 1929.

[41] Bulletin de la Société Centrale Forestière de Belgique, 30:16–21. 1923.

Any infraction of the working plan or failure to carry out reforestation as required may be punished by a fine or by expropriation of the land. An owner also may request that land subject to mandatory control be expropriated. The income from the sale of timber and land from the State domain is to be used exclusively for the purchase and afforestation of land to be managed as public forest.

Under the law of 1901 private forests outside of the zone of public utility may be submitted to control upon the request of the owners, either individually or through associations. Forests subjected to such optional control are entitled to the same benefits and are subject to the same restrictions as those subject to mandatory control, except in the case of what is called "simple police control", in which the owner merely desires public assistance in reforesting and protecting his forest. In this case planting stock and technical help in planting are furnished at cost instead of gratis, and the owner is not obliged to follow any set plan of management.

Since 1927 all private owners have been required to obtain permission before cutting, unless their forests are handled under approved working plans.

RUMANIA [42]

About 40 percent of the forest area of Rumania was privately owned in 1922, but agrarian legislation allotting public land to the peasants has resulted in a considerable increase in private forest since then. A large part of the standing timber is controlled by large owners or industrialists, either through direct ownership or through lease.

Mandatory control is applied to protection forests; that is, those on the crests and slopes of mountains and hills or on the headwaters of torrents, as well as any others serving to prevent landslides, erosion, or washing of stream banks, to protect roads or railroads on or near steep slopes, stabilize drifting sands, or to regularize stream flow; and those needed for the national defense (upon recommendation of the Minister of War).

Such forests must be managed according to working plans, or equivalent plans of operation, prepared by qualified technicians and approved by the Technical Council. Deforestation is not allowed. In case of cutting within 12 years, a guarantee fund must be deposited with the Ministry of Domains to insure that the area will be reforested. After 12 years this deposit may be dispensed with, providing the owner has managed his forest for at least 10 years in such a manner that the cut-over areas are well stocked and in good condition. If the owner or operator fails to reforest satisfactorily within the period prescribed in the plan, the State will do it at his expense.

Grazing may be allowed only to an extent that will not endanger the regeneration of the forest. It is not allowed in even-aged stands less than 30 years old which have followed clear cutting, in coppice less than 15 years old, in selection forest with a cutting cycle of less than 15 years, or in any forest where gullying has started or is threatened.

In nonprotection forests stock may not be grazed in stands less than 10 years old (except those of willow, cottonwood, and the like, which

[42] Sburlan, A., "Die Wälder Rumäniens deren Holzindustrie und Holzhandel." Centralbl. f.d. Gesamte Forstwesen 55:49–70. 1929.
Rumanian Code forestier. Apr. 1, 1910

may be grazed after 3 years). Deforestation (including destruction by overgrazing, by burning, or by overcutting contrary to an approved working plan) is forbidden with certain exceptions, and then requires the approval of the Minister of Agriculture and Domains, after a field examination and recommendation by the Technical Council.

Forest other than protection forest may be subjected to the régime forestier upon application by the owner. The State is to encourage the reforestation of all forests by having State forest officers make working plans when requested to do so by the owners, by furnishing seed and plants free or at cost, and by premiums and tax reductions in return for good forest management.

RUSSIA [43]

Although, strictly speaking, there are now no private forests in the Soviet Union, considerable areas of forest have been turned over to the villages and agricultural communes, workers' associations, and even to individuals, for use and management. These are practically equivalent to private forests. The holders must protect them from fire, theft, and overgrazing, and must follow working plans prepared by the Provincial Forest Department at the cost of the user. Openings that will not reforest naturally must be replanted. Clearing for other use may be permitted under suitable restrictions. If users fail to comply with these requirements the forests may be taken from them.

Exploitation of most of the state forests is under control of the Supreme Economic Council, and is not subject to regulation by the forestry authorities. Cutting on a large scale has been done without regard to the perpetuation of the forests, and great areas have been devastated. In view of the evil effects of denudation in certain regions, the Government in 1931 provided for a segregation of forests of silvicultural importance, to be protected and managed by the Commissariat of Agriculture. These forests include those of the poorly forested districts of the south and east and those on the headwaters of certain rivers such as the Volga, the Don, and the Dnieper. Cutting in these forests must be gradually reduced so that by 1935 it does not exceed the annual growth. All forests in a 1-kilometer strip on each side of the lower and middle reaches of the Volga, Don, Dnieper, and Ural Rivers are declared protection forests, in which only dead and defective timber may be cut.

The former forest law (that of 1888) provided for various degrees of public control, depending on the situation of the forest. Local forest boards were set up in each province and district, consisting of representatives of the local administration, forest owners, foresters, and a local justice, with the governor as chairman.

The board's permission was required before forest land could be cleared, but it was usually granted (except in case of "protected" forests) where the land was suitable for agriculture. Except in clearing land it was not permitted to cut in such a manner as to prevent natural regeneration, or to pasture cattle on land stocked with young growth. Owners of nonprotection forest could submit a working plan to the board, and if it was approved they were allowed to operate

[43] Der Forstkodex der Russischen Socialistischen Föderativen Sowjet-Republik. (Translated into German by E. Buchholz.) Forstwissenschaftliches Centralblatt 51:132–146. 1929.
Fernow, B. E., A Brief History of Forestry, pp. 264–268. Cambridge, Mass., 1911.
Buchholz, Erwin, Die Wald- und Holzwirtschaft Sowjet-Russlands. 131 pp. Berlin, 1932.

under it without further restriction. The Government provided free technical advice, plants, and seed free, or at cost, and long-term loans on forests managed under working plans.

Forests on the headwaters and upper reaches of streams (except in the Caucasus and certain northern Provinces) were classed as protected forests. These were subject to the same restrictions as the nonprotection forests, and in addition the forest board could prohibit clearing unless the area was so small that no harm would result.

A third class of forest included the protective forests, which were those protecting drifting sands, banks of rivers and other waters, and mountain slopes liable to erosion, landslides, or avalanches. These forests were classified by the forestry boards, and were required to be managed under working plans prepared (without cost to the owner) by the Crown forest department and approved by the board. Conversion to farm use was prohibited, and the board could prescribe in detail the method of management and utilization. All protective forests were exempt from taxation. Expropriation was provided for in case an owner refused to incur the expense of the measures imposed by the board, but he was allowed to recover his forest at any time within 10 years by paying the costs, with interest.

SPAIN [44]

In 1930, three fourths of the forest land (about one half of the productive forest) of Spain was in private ownership. Under legislation then in force, clearing of forests (deforestation) is forbidden except to put the land to agricultural use and upon written agreement that it will be thus utilized within a reasonable time. Permission to clear must be obtained from the civil governor, after consultation with the forest or agricultural officer of the district, or both of them. Permission of the Governor must also be obtained before converting coppice-with-standards to simple coppice.

Clear cutting, except where the land is to be cleared, is also forbidden. An owner may cut not to exceed one fifth of the total number of trees during any 10-year period in forests of the principal commercial species, or during a 5-year period for fast-growing species such as poplar, aspen, willow, birch, alder, and eucalyptus. This restriction does not apply to coppice stands, but in those the stumps must not be uprooted. It also does not apply to tracts of less than 5 hectares, or to forests cut in accordance with working plans where the cut does not exceed the annual growth. Certain exceptions are also allowed where the forests are comparatively inaccessible or where ties are being cut for the national railways, so long as sufficient young trees are left to insure the continued existence of the forest. Stands that are planted expressly for production of posts and mine props may be cut clear if the land is replanted within a year. To take advantage of these exceptions, special permission must be obtained from the civil governor upon recommendation of the municipal authorities. Within the above limitations, the owner is not required to report any cutting.

Two thirds of the fines collected for violations of the law go into a special fund which is used to reward those who restock bare lands.

[44] Real decreto de 3 de diciembre de 1924 regulando las cortas y descuajes en los montes de propiedad particular, y instrucciones para su cumplimiento.

SWEDEN [45]

In Sweden, more than three fourths of the forest is privately owned, and more than half of this belongs to farmers. Control over the management of private forests is vested in the provincial forest conservation boards, of which there are some 24. There is no central board, and these boards are entirely independent of the State forest administration, although they cooperate closely with it. An owner may appeal from the board's decisions to (1) the provincial government, and (2) the King. The boards under this law consist each of three persons acquainted with local conditions, one representing the National Government, one the local government, and one the local timber owners' association. If there is more than one association, each has a representative, and the local government's representatives are increased accordingly. Each board employs a technical forester as secretary, as well as assistants, rangers, and office staff. It is the duty of the boards to inspect private forests, enforce regulations, and promote forest management through extension and demonstration. Each parish may have a similar local board of three members, one appointed by the county board and two by the parish vestry board.

A forest conservation tax or a severance tax is collected, amounting to 1.3 percent of the value of the cut wood. Of this, 90 percent goes for the support of the conservation board in the district where collected, and 10 percent goes to the national treasury for distribution, if necessary, among other districts. The boards also receive subsidies from the central and provincial governments, and some income from the sale of seed and planting stock, etc.

In most of the provinces young forests may not be felled except to fill domestic needs where no other timber is available, or unless such cutting is in accord with good forestry principles (thinning) and done with the permission of the forest conservation board, under such restrictions as the board may impose. Older forests may not be cut in such a manner as to imperil the regrowth of the forest, nor may the ground be treated after cutting in a way that will prevent forest reproduction. Unless authorized by the board, no cutting may be done, except for domestic use of the owner, which will not leave enough timber to meet future domestic needs. An owner may ask the board for a statement as to the legality of any proposed cutting, and any cutting done in accord with such a statement will be legal. The board may prohibit cutting that is being done or that there is reason to believe will be done contrary to regulations or stipulations. The provincial forester may be authorized to enforce this provision, subject to confirmation by the board itself within 10 days.

Unless reproduction takes place within a reasonable time after cutting, the owner may be required to restock the land by artificial means. He may also be required to reforest areas destroyed by fire, storm, insects, grazing, etc., but unless such destruction was his own fault he may not be required to spend more than the salvage value of the damaged timber, plus any compensation (such as insurance) that

[45] Law of July 24, 1903 (Protection forests). Law of July 24, 1903 (Västerbotten and Norrbotten). Law of June 13, 1908 (Gottland). Law of June 15, 1923 (Forest in general). Law of June 15, 1923 (Forest conservation boards). Law of July 24, 1903 (Timber sale agreements). Law of October 11, 1912 (Forest conservation tax).

he may have received for the loss. The board is to agree with the owner as to the measures necessary to insure regrowth. In case of failure to agree, the county government may be requested to appoint an investigating committee which will report its recommendations, and if necessary a court may decide the matter. If the required measures are not carried out within the specified period, the board, through its forester and two other persons, in company with the owner, is to make an investigation and, if necessary, to carry out the measures at the owner's expense. The board may also require a deposit to guarantee reforestation where artificial reforestation is likely to be necessary because of the method of cutting.

At the request of the board, the provincial government may restrict cutting in areas where reproduction is likely to be especially difficult or impossible, may require that seed trees be left, and may empower the board to prescribe measures for insuring reproduction. It may even require that the board's consent be obtained for any cutting, except for domestic use, and that the timber be marked by the county forester or other person designated by the board.

With the board's permission, forest land may be cleared for cultivation, pasture, buildings, etc., if the land is suitable for such use and if the area to be cleared is not unreasonably large.

Leases or timber-sale agreements may not be made for longer terms than 5 years.

A special law deals with protection forests, the preservation of which is necessary for protection against landslides and drifting sand. The King, upon recommendation of the local conservation board, may decree that no cutting shall be done in such forests, except for the domestic use of the owner, without a permit from a State forester. Further restrictions may be imposed if necessary. If an owner prefers to give up his land rather than submit to restriction on its use, the State is to buy it.

There are also special laws applicable to several of the individual provinces. In Vasterbotten and Norrbotten it is forbidden to cut coniferous trees for commercial use that are less than 21 centimeters (8.4 inches) in diameter inside bark, except where orderly management of the forest requires that such trees be cut. Even then a permit must be obtained from the local forester and he must mark the trees to be cut. The owner has to pay the forester for his time and expenses in making inspections, but not for the cost of marking. Forests may be cleared in order to cultivate the ground, erect buildings, etc., but the wood that is cut may not be sold except with the permission of the forester.

In Gottland, an owner may not cut any timber (except for his own use or to clear the land for cultivation) without the permission of the conservation board, which may prescribe measures to insure restocking. This permission is to be given only after inspection on the ground. The board may carry out reforestation measures at the owner's expense if he fails to do so. If necessary, the King, after a hearing by the county commissioners, may impose restrictions on grazing in order to protect young growth.

SWITZERLAND [46]

Less than one third of the forest area of Switzerland is privately owned, and the private forests are mostly in very small tracts. Few are over 200 hectares (500 acres) in extent. There are practically no important areas of private forest in the high mountain districts. Public regulation is based on the policy that the forest area of the country must not be diminished.

Although many of the cantons had laws regulating clearing of forest land, these were generally little enforced until severe floods in 1830 and subsequent years called attention to the protective value of forest cover. Later, the Federal Government made small grants toward reforestation and engineering works in the Alps. In 1876 a law was passed providing for Federal control over protection forests in the mountainous portions of certain cantons. In 1902 the Federal Government assumed general supervision over all the forests of the country, which were to be classified as protection forests and nonprotection forests. This classification was done by the cantonal authorities, subject to approval by the Federal council.

Protection forests were those in the reception basins of torrent and those affording protection against avalanches, falling rocks, landslides, soil washing, irregularities of stream flow, and harmful climatic influences. In 1914, 60.8 percent of all private forests were classed as protection forests. In 1923 nonprotection forests were put under restrictions similar to those governing protection forests.

Deforestation or even clear cutting is forbidden unless especially authorized (for nonprotection forests) by the cantonal or (for protection forests) by the Federal authorities. Where such permission is given, the authorities may require the afforestation of an equal area elsewhere. All cutting must be supervised by foresters. Cut-over areas, as well as openings caused by fire, avalanche (where possible to restock such areas), windstorms, etc., must be reforested within 3 years. Trees in wooded pastures must be conserved so far as possible.

The Federal Government or the cantons may require an owner to construct defensive works against avalanches and rock slides, and to establish protective forests where these are necessary to protect existing forests from damage. The confederation and the cantons pay a large part of the cost of such work. An owner may demand that the canton or commune purchase land on which the creation of a protective forest or defensive works has been ordered. The Federal Government contributes up to 50 percent of the purchase price for lands bought by the cantons or communes.

Where privately owned forests are in especially exposed situations or in the reception basins of torrents, the owners may be compelled to pool their forests so that they can be managed according to a common plan. The Federal Government pays the cost of organizing these combinations and the cantonal foresters are to supervise them without cost to the owners. The formation of similar associations may also be required in other places upon request of two thirds of the owners if they own more than one half of the forest land within the unit. The

[46] Loi federale concernant la haute surveillance de la Confederation sur la police des forêts, du 11 Octobre 1902.

Fernow, B. E., A Brief History of Forestry, p. 191–197. Cambridge, Mass., 1911.

Paillié, M., "Rapport sur l'intervention de l'Etat dans la gestion des forêts particulières d'après quelques législations récentes. In Actes Congrès International de Sylviculture, p. 32–53. Internatl. Inst. Agr., Rome, 1926.

Petitmermet, M., manuscript report in files of U.S. Forest Service. 1931.

Federal Government (in some instances with additional grants by the cantons) contributes 30 to 50 percent of the cost of reforestation in protection forests where the opening is the result of fire, storm, avalanche, or insect epidemic, and also contribute up to 40 percent of the cost of logging roads and other facilities for transporting timber.

Most of the cantons have their own forest laws, which supplement the Federal law. Some of them are considerably more restrictive. In Berne, for instance, no forest may be cleared unless at least an equal area is planted. Grazing in the catchment basins of torrents is prohibited, and any forest grazing or gathering of litter is subject to strict supervision. Protection forests must be handled under working plans approved by the cantonal council, and their execution is supervised by the cantonal foresters. All cutting, except for household use, must be authorized in advance. In Vaud all trees over 15 centimeters (6 inches) in diameter that are to be cut must be marked. Any cutting removing more than 20 cubic meters per hectare (approximately 280 cubic feet per acre), or unduly breaking the canopy, must be authorized in advance, and the method of cutting may be prescribed in detail.

In Valais, for every cutting amounting to more than 5 cubic meters in high forest or 12 cubic meters in coppice, the trees must be marked with the assistance of a cantonal forester, and for commercial cutting in excess of 30 cubic meters of timber or 40 steres of cordwood the marking must be done by the forester. When clearing is allowed, the owner must reforest an equivalent area at his own expense. Grazing where the young growth is less than 4 meters high is forbidden. In Neufchâtel trees to be cut must be marked in company with an inspector. Clear cutting of more than 0.3 hectare in one place may not be done unless authorized by the Federal council.

TANGANYIKA [47]

The area of privately owned forests in Tanganyika is relatively small. Not more than one fourth of the area of any forest of more than 250 acres may be cleared unless reforestation is assured. The Conservator of Forests may control felling on lands situated on catchment basins where it appears that cutting of the timber would jeopardize water supplies. Private owners who manage their forests under working plans approved by the conservator are not subject to other restrictions.

TURKEY [48]

Less than 5 percent of the Turkish forest is privately owned. The forestry law of 1924 requires an owner to obtain a permit before cutting in his forest. Such permission may be refused unless he submits a plan of exploitation.

YUGOSLAVIA [49]

About one third of the forest area of Yugoslavia is in private ownership, mostly in small holdings. The forest legislation is based on the principle that the soil of the country, regardless of its nominal owner-

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[47] Proceedings of British Empire Forestry Conference, 1928, p. 80.

[48] Hinkle, E. M., Manuscript report in files of U.S. Forest Service. 1932.

[49] Loi sur les forêts, 21 decembre 1929. In Annuaire International de Legislation Agricole, 1930. Internatl. Inst. Agr., Rome, 1930.
Ugrenovic, Aleksander, Manuscript report in files of U.S. Forest Service. 1932.

ship, belongs to society, including all future generations, and that consequently it must not be utilized in such a way as to destroy or reduce its productivity. The owner has the right to dispose of the timber in any way he may see fit, provided he does not impair the continued productivity of the land or the protective effect of the forest in case of classified protection forests.

Existing forest must be conserved. Land that is essentially forest land (because of soil, topography, and location) may be cleared only for building roads, reservoirs, or other construction. The clearing of other forest land may be authorized where it will be put to better use, without injury to other parties. Local administrative officials may authorize clearings of less than 5 hectares; larger ones are passed upon by the governor of the province. Management plans must be submitted for forests of over 300 hectares, and every forest enterprise with an annual output of over 30,000 cubic meters of hardwood or 50,000 cubic meters of softwood is required to employ a qualified forester, who must be a Yugoslav citizen.

Forest devastation is forbidden, as is any practice that will impoverish the soil or endanger its continuous productivity. Cut-over land must be reforested within three years and land denuded prior to adoption of the law (1930) within five years, according to methods prescribed by the authorities. If an owner fails to do this, it is to be done at his expense.

Every owner must take care, in cutting his forest, not to expose neighboring forests to damage from wind. He may be required to leave a protection strip as wide as twice the height of the neighboring trees. Owners must use all reasonable means to combat disease or insect epidemics, and must notify the authorities immediately of their outbreak. Forests may not be grazed so as to injure the young growth. Livestock must be in charge of a herder, must use designated roads in going to and from the range, and must be kept in corrals between sunset and sunrise. Goats are not to be allowed in forests, with certain exceptions. Methods of utilizing dead litter and green foliage (for fodder) are also subject to restriction, as is the use of fire in or near forests.

Private forests may be divided only with the consent of the proper authorities, who may refuse permission when the division seems likely to jeopardize continuity of production. Two thirds of the owners of forests within a natural unit, if they own at least two thirds (by value) of the land, may form a cooperative association for purposes of protecting and managing the forests, and other owners within the unit may be required to join.

Protection forests are to be designated by the governor in each province, either upon his own initiative or upon request by interested parties, and after examination by forestry experts. Permanent protection forests are those protecting the soil from sliding, blowing, or washing; those protecting springs or preventing rapid run-off or avalanches, and those near timber line. Temporary protection forests are those serving as windbreaks, etc. Forests serving purposes of national defense may be either permanently or temporarily classified. Clear cutting in protection forests is forbidden, and the Minister of Forests and Mines may prescribe measures essential to maintain the protective effect of the forest. In case these restrictions exceed those necessary to prevent devastation the property is to be partly or

wholly exempted from taxation. If the restrictions are so onerous as to cause serious loss to the owner he may require that those who are benefited buy the forest. All protection forests must be managed under approved working plans, prepared by graduate foresters who are Yugoslav citizens. These plans are to be based on continuous forest production, but not necessarily on the principle of sustained yield.

Land which is not now forested, but which is suitable for forest growth and should be forested in order to protect the soil, prevent silting, or promote health, etc., is also to be classified as protection forest by a special commission in each province. Afforestation of such land must be undertaken promptly and completed within 50 years. The State is to cooperate by providing planting stock and supervision, and by granting tax exemptions, cash subsidies, and non-interest-bearing loans.

ESSENTIAL FEATURES OF FOREIGN CONTROL POLICIES

The policies of the various countries differ widely as to both the degree and the method of public control over private forests. Certain fundamentals, however, are common to many of them. Most of the world has come to the conclusion that forests should be preserved, and that this will require public action. Hiley has stated the situation concisely, as follows:

> It may be accepted as a generalization that private or commercial ownership of forests, when unfettered by legislative restriction, generally leads to devastation * * *. The accepted solution of the problem is some form of state intervention, and state control of forests is now practiced in nearly every civilized country in the world.[50]

The essential features of a composite policy, which might be built up from the most generally accepted principles of the many different policies described above, may be summarized as follows:

1. As a general principle, an owner is free to manage and utilize his forest as he pleases, so long as such use does not directly or indirectly injure other individuals or the public welfare.

2. Destruction or mismanagement of forests which serve to hold the soil in place, conserve water, regulate the flow of streams, protect the public health, or promote the national defense is certain to result in injury to others. The public exercises a sufficient degree of control over this class of forests to insure that their protective functions are not jeopardized. This involves the maintenance of a continuous forest cover. It frequently involves the execution of reforestation or engineering improvement works, or even the afforestation of hitherto nonwooded land, either by public agencies or by the owner. Except where reforestation is made necessary by act of the owner the public pays part or all of the cost. The public usually indemnifies the owner for any loss of income resulting from restrictions on the use of protection forests. As an alternative the public may acquire the land, either at the owner's request or by condemantion.

3. Protection forests are classified as such by a commission or by some high governmental agency, upon the recommendation of some public body or upon application of interested individuals or groups, and after appropriate investigation and hearings. The forest service

[50] Hiley, W. E., The Economics of Forestry. 256 p. Oxford University Press, 1930.

or other agency responsible for enforcing the law may initiate the classification and may be required to make the field examination and report its recommendations, but it generally does not have the power to render the final decision as to classification.

4. Cutting in classified protection forests may be done only with permission of the competent authorities. The methods of cutting and of utilizing the forage and other products which may be allowed in such forests are specified in some detail either in the law or in regulations of the supervisory authority. Reforestation of cut-over areas is compulsory. Management plans and employment of trained foresters may be required but generally are more or less optional. An owner handling his forest according to an approved plan and under the supervision of a trained forester is not required to get a special permit for each operation.

5. Gross misuse which destroys or seriously impairs the productivity of the land is generally assumed to be inimical to the public welfare. The object of control over other than protection forests is generally not to compel owners to produce any particular kind or quantity of material, but to insure that the land will be kept in a productive condition. Sustained yield management is usually not required, and control over methods of management and utilization is reduced to a minimum. A permit is usually required for deforestation, but it is granted if the land is suitable for other use and will be utilized productively. Otherwise, reforestation by natural or artificial means is required. Working plans are usually optional with the owner, and are primarily for his own protection or convenience. Although the public exercises or holds in the background definite mandatory powers to prevent destruction of nonprotection forests, it attempts to bring about good management largely through educating and cooperating with the owners.

6. Public control in many countries is democratized and decentralized by being put under the general supervision of local or provincial boards or commissions on which forest owners, technicians, and administrative officials, and in some instances the local population, are represented. A few countries, mostly small ones, have only one central commission for the entire country. In some countries these boards have their own administrative and inspection forces and work independently of the state forest service. In other countries the boards exercise general supervision but actual administration is by officers of the state forest services.

IS FURTHER PUBLIC REGULATION DESIRABLE IN THE UNITED STATES

PRACTICES IN NEED OF CORRECTION

In order to determine whether further public control over private forests in the United States may be desirable, it is necessary first to inquire what controllable conditions or practices threaten to destroy the forests, to hinder or prevent their replacement after cutting, or to render them less productive. These may be classified as follows:

(1) Failure to provide effective protection against fire, as well as practices which cause fires directly or which increase the fire hazard, and also the failure to adopt reasonable measures for preventing and suppressing fires.

(2) Neglect of reasonable measures for preventing or checking attacks of diseases and insects, and also those practices which favor the spread of destructive pests.

(3) Destructive exploitation. That exploitation is destructive which (*a*) destroys potentially usable timber without using it; (*b*) renders natural reproduction of good species uncertain or impossible (unless the operation is followed promptly by effective artificial reforestation); (*c*) depletes the growing stock in quantity or quality so that the forests of an economic unit are incapable of maintaining a continuous production; or (*d*) increases unnecessarily the hazard from fire, insects, diseases, and storms for either the remaining or the succeeding stand or for neighboring forests.

(4) Clearing of forest land not needed for agriculture or other use, where the physical and economic conditions are so unfavorable to such use that abandonment and reversion to a state of idleness are fairly certain.

(5) Improper silvicultural practices, resulting in unsatisfactory stocking, reduction in yields, and in the productive capacity of the soil, deterioration in quality of the product and reduction in net income.

It is desirable that all of the above practices be checked or corrected. It probably is not desirable and certainly is not practical at the present time, to correct all of them through mandatory regulation by public agencies.

PRACTICES TO WHICH OPTIONAL REGULATION MIGHT APPLY

Up to a certain point, the right of the public to exercise mandatory control is generally recognized, at least in theory. Beyond that point, depending on local conditions, regulation will be feasible only if it is acceptable to the owners and shared by them. As has been pointed out, the public can compel individuals to desist from practices which will result in direct injury to other individuals or to the public. The right of the public to interfere for the purpose of maintaining the yields of private forests at a high level is less well established.

Practices which are undesirable chiefly because they reduce the owner's income and depreciate the value of his property include the following:

(1) Premature cutting of immature or economically unripe timber of desirable species and quality, especially where this is done at a loss.

(2) Wasteful methods in woods and mills.

(3) Premature turpentining of timber that is too small, and turpentining methods leading to waste of the timber.

(4) Improper or inefficient silvicultural practices, such as:

(a) Choice of species not suited to the site.

(b) Carelessness as to the source of seed for raising planting stock, resulting in the use of races ill-adapted to the site.

(c) Adoption of too short rotations, leading to deterioration of the site, difficulty of natural reproduction, and production of inferior material.

(d) Reliance on coppice rather than seed to establish the new stand.

(e) Failure to maintain the optimum density of stand, or to thin and weed as necessary.

(f) Failure to reforest or afforest bare areas resulting from earlier logging, fires, etc.

(g) Failure to maintain a suitable mixture of species so as to maintain the fertility of the site and take full advantage of its productive capacity.

(h) Culling the best trees, thus leaving inferior and defective individuals as a growing stock.

(i) Failure to cut old decadent and defective trees which are hindering the growth of valuable individuals.

(5) Cutting of timber (except where desirable to reduce surplus growing stock) in excess of the annual increment of the unit.

Desirable standards with regard to these practices cannot be attained through restrictive legislation, unless the owners voluntarily consent to public control. About all that the public can do is to attempt to persuade them to adopt desirable practices. This can be accomplished in part through systematic suggestion, education, and demonstration. In some instances, however, forest owners will readily accept a certain degree of restriction in return for assistance by the public. In view of the public benefit that would result from the better handling of forests in general, it is appropriate for the public to help individual owners or associations of owners in improving their practices, providing the owners will submit to restrictions which will safeguard the public interest.

PUBLIC AID AS BASIS FOR OPTIONAL REGULATION

Such assistance may take the following forms, all of which have been tried in foreign countries, and several of them in the United States, as discussed in other sections of this report:

(1) Management of the forest for the owner, to such extent and with such division of the costs as may be agreed upon.

(2) Grant of free or low-cost planting stock and other material.

(3) Tax concessions or adjustments of various sorts intended to lighten the financial burden on the owner.

(4) Loans or other credits on favorable terms, sponsored by public agencies.

(5) Concessions in public forests, providing for integrated sustained yield management under some degree of public control.

(6) Public insurance against fire and other loss, or some form of assistance in establishing a working system of private insurance.

(7) Outright subsidy, for certain specified operations or practices.

(8) Assistance in construction of roads and other means of exploiting the forests efficiently on a permanent basis.

(9) Assistance in preventing and combatting fires and fungus and insect pests.

Public aid will not be justified merely for the purpose of benefiting individual forest owners. It will be justified only if benefit to the public will result. It should not be regarded as a bonus or gift to forest owners, but as a payment for which value will be received by the public. So far as practicable, grants of public aid should be contingent upon acceptance of restrictions which will insure that the value will be received. In short, private forest owners should not be favored with special privileges or services at the expense of the public treasury, unless they assume corresponding obligations with respect to the handling of their forests.

OPTIONAL REGULATION THROUGH ASSOCIATIONS

One other form of control which has been proposed recently is control through organizations of forest industries or forest owners. From the standpoint of the public, there can be no legitimate objection to voluntary association or combination of owners and/or operators for the purpose of bringing about desirable ends which they cannot accomplish independently. Such objectives, for instance, might be protection against fire or insect epidemics, or adoption of sustained yield management in a unit where holdings are comparatively small or intermingled or for other reasons not capable of management as independent units. The laws of some countries seek to promote the formation of associations for these purposes, particularly among the owners of small and medium-sized tracts. In this country several States provide for associations for protection against fires and insects.

In order for such combinations to accomplish their purpose, it might be necessary to provide some way by which owners who will not conform voluntarily to the policies of the group would be compelled to do so. Whether a State can legally, or would if it could, grant authority to associations or combinations of individuals to compel action by other individuals is doubtful. It is not likely that the State would either delegate its police powers to private individuals or associations, or sanction enforcement through "unfair" methods of competition. It must follow, then, if there is to be any compulsion of unwilling owners, that it will have to be exercised by public agencies. It is fairly certain that such authority will not be exercised unless to enforce policies which are clearly in the public interest—those making for the stability of industries, communities, employment, and public revenues; for the conservation of natural or human resources; or to protect the interests of consumers.

There is no doubt that the Federal Government has the authority to enforce compliance with a program for organized fire protection, or even for the regulation of cutting, where preservation of the forest is necessary for purposes of national defense, to prevent damage to lands or other property of the Federal Government, to maintain the navigability of streams and harbors, or to prevent damage to persons or property beyond the borders of the State. The authority of the States, at least, undoubtedly goes further than this. It might be feasible for State law to provide that when most of the owners—perhaps two thirds or three fourths, in consultation with a suitable public agency—agree upon certain practices as desirable or necessary to safeguard or promote the public interest, the remaining owners may be required to fall in line, at least to the extent that they do not obstruct the program of the group. If such a policy should be adopted, it would also be necessary to provide that where owners refuse or are unable to conform with the prescribed program their land may be expropriated, either permanently or temporarily, after due compensation.

PRACTICES WHICH MIGHT PROPERLY BE SUBJECT TO MANDATORY REGULATION

Obviously, the simplest way to insure the correction of harmful practices would be for the public to acquire all of the forest which affects the public interest. But even if the public should embark on

a large-scale program of acquisition, it would probably take a very long time to get all of the forest that should be acquired. Meanwhile, if there are no restrictions on the utilization and management of the forests, present practices may be continued, with irreparable injury to the forests themselves, to their owners, and to the public. Whether or not the eventual solution is to be public ownership of virtually the entire forest area, some means should be found to protect the public interest as long as the forests remain in private ownership. Much can be accomplished through public assistance to and cooperation with private owners. There is nothing in the experience of this or any other country, however, to give grounds for confidence that voluntary cooperation will sufficiently safeguard the forests.

From the standpoint of public policy, there can be no valid objection, in principle, to such degree of public control over private property as may be necessary to prevent injury to other individuals or to the public in general. This principle is thoroughly established in the laws of every State. That it applies to forest property as well as to every other kind of property is admitted by spokesmen of the forest owners, even though they may question the advisability of regulation which goes beyond this. To quote two of them:

> The States * * * can and should make drastic regulations to prevent forest fires. * * * Every owner of forest land (should) be required to conduct operations thereon in such a manner as to avoid creating a fire menace to adjacent property.[51]
>
> Like every other owner of property, the owner of forest land is bound in law so to use his property as to do no harm to the property of another, and to do no public injury. This obligation is universal, is everywhere recognized, and should be enforced.[52]

The application of this principle to forest property has been clearly upheld by the Supreme Court of Maine. That court ruled that the State may regulate cutting or destruction of trees growing upon privately owned land, for the purpose of promoting "the common welfare by preventing or diminishing injurious droughts and freshets, and by protecting, preserving, and maintaining the natural water supply of the springs, streams, ponds and lakes and of the lands, and by preventing or diminishing injurious erosion of the land and the filling up of the rivers, ponds and lakes." One of the principal reasons which the court gave for reaching its decision is stated as follows:

> The amount of land being incapable of increase, if the owners of large tracts can waste them at will without State restriction, the State and its people may be helplessly impoverished and one great purpose of government defeated.[53]

PREVENTION OF DIRECT INJURY TO OTHERS

That mandatory or compulsory control is logical public policy is shown by the fact that it is already provided for, in varying degree, by the laws of several States with respect to those practices which threaten direct injury to other persons or the general welfare. These practices include:

(1) Practices which increase the danger from fire, such as (*a*) carelessness with fire in connection with timber-cutting operations or

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[51] R. S. Kellogg, in Journal of Forestry 19:641–646. (October 1921.)
[52] Wilson Compton, in Journal of Forestry 18:258. (March 1920.)
[53] See Seventh Report of the Forest Commissioner of the State of Maine. 1908. pp. 30–35.

other use of the land; (*b*) failure to provide and, if necessary, to use suitable safeguards and fire-fighting equipment in connection with operations (firebreaks, spark arresters, tools, etc.); (*c*) increasing the fire hazard through creating or leaving dangerous accumulations of slash, standing snags, or other inflammable material, or through clear cutting over too large areas; (*d*) failure to control fires, no matter how they start, so as to prevent their escape to another's land.

(2) Practices which increase the danger of damage by diseases and insects, including (*a*) creation of breeding places through leaving accumulations of slash, or leaving unpeeled logs in the woods under certain conditions; (*b*) failure to carry out such sanitary measures, within reasonable limits, as may be necessary to check the spread of insects or diseases.

(3) Practices which increase the danger from windthrow to the adjacent forests of other owners. This frequently results from clear cutting close to the boundary lines of the property.

PROTECTION OF WATERSHED VALUES

According to another section of this report ("Watershed and Related Forest Influences"), some 300 million acres of forest land now in private ownership has great public value for purposes of protecting watersheds, preventing erosion or landslides, and for related purposes. Large areas of other land that was cleared in the past have eroded so badly after a brief period of cultivation that they can no longer be used unless reforested. In the section on "Current Forest Devastation and Deterioration" it is estimated that some 850,000 acres a year of privately owned commercial forest land is being devastated, chiefly as a result of fires following cutting. Probably 300,000 to 350,000 acres of this is so located as to have high value for protective purposes. For this class of forest, mandatory regulation might legitimately go much farther, and might extend to any practices which will destroy or seriously impair the protective value of the forest, such as:

Methods of logging which tend unnecessarily to destroy or damage immature timber and young growth.

Clear cutting of large areas on sites where exposure to sun and wind will result in site deterioration, erosion of the soil, or increased danger from fire; especially clear cutting on steep slopes.

Failure to leave suitable seed trees or to provide otherwise for prompt restocking by natural or artificial means.

Overgrazing, resulting in injury to or elimination of young growth, destruction of protective ground cover, deterioration of the site, or erosion; especially on reproduction areas.

Clearing of land (deforestation) either to put it to other use or to leave it in a state of denuded idleness.

FURTHER MANDATORY REGULATION

It can be argued that mandatory regulation should go much farther than this. It can hardly be denied that devastation of his own land by a forest owner, even where watershed and soil protection are not involved, results in loss to the community, State, and Nation. It not only impoverishes existing communities, but it also reduces the sum total of natural resources available for future genera-

tions. Anyone who has seen the wrecked landscapes and man-made deserts which have followed the exploitation of forests in some of the flat lands of the Lake States or the southeastern coastal plain will readily admit that the public welfare has been adversely affected. It is unthinkable that the public should be helpless to protect itself against such waste, or should have to wait and repair the damage after it has been done instead of preventing it. However, if fires can be held in check the most serious cause of forest devastation and deterioration will have been eliminated, and nature will grow a new crop of timber on most of the land that is cut over in the future, as well as on much of that already cut over.

Mandatory regulation beyond that sufficient to hold fires and pests in check, and in the case of protection forests, to maintain a forest cover, might be too drastic for the American people for a long time to come. Even if laws providing for a greater degree of regulation were adopted, they would undoubtedly be difficult to enforce. Attempts to enforce them would very likely jeopardize the effectiveness of more moderate and reasonable forms of regulation. It should also be recognized that general mandatory regulation, even of protection forests, is not likely to be adopted overnight, either by the Federal Goverment or by any considerable number of States. This will have to come about gradually. Quite possibly, however, it may come more rapidly than was the case with the modest degree of regulation now in effect with respect to the control of fire. The cumulative effects of the mistreatment of forests and forest land are becoming more and more evident. As soon as the public demonstrates its readiness to help them by assuming its equitable share of the cost of maintaining protection forests, forest owners will be less likely to object to reasonable restrictions.

ELEMENTS OF A POSSIBLE PUBLIC REGULATION POLICY

If it should be decided to go farther than existing laws in the direction of public regulation, there are several principles which might well be taken into account in formulating policies.

In the beginning, at least, public mandatory regulation should be confined to those things that are clearly the most essential and which the public most unquestionably has the right to demand for its own protection. Specific recommendations on this point are discussed in a later chapter of this report. (Section on "A Possible Program for Public Regulation" in the chapter on "The National Programs Required.") The regulatory laws should be simple and their scope clearly defined. They should provide that forest owners or their representatives be consulted in the formulation and execution of enforcement regulations.

On its part, the public should fulfill its responsibilities in protecting the owners against injury for which they are in no way to blame, such as fires originating on outside land or from causes beyond their control. It is desirable also that the public go a long way in helping forest owners to carry out a positive, constructive program, that is, to do more than merely prevent the destruction of their own or neighboring forests. The question of public assistance to private owners is discussed under the headings "Federal and State Aid" in other sections of this report. In some instances, such assistance might

well be contingent upon a still further degree of public control. This might be the case where acceptance of aid, and consequently of control, is optional with the owners. It is only reasonable that the public should pay for measures aimed primarily at benefiting the public rather than the individual owners. The principle should be maintained from the outset, however, that a private owner is neither morally nor legally entitled to any reward or compensation for obeying such restrictions as may be necessary to prevent injury to other individuals or the public.

Because of constitutional limitations upon the powers of the Federal, State, and local governments, no uniform method of public control can be applied to all private forests in the United States. Control may be exercised under certain conditions by the Federal Government. Under certain other conditions the States unquestionably have the necessary authority to do what the Federal Government cannot do. For these reasons a comprehensive policy would embrace three forms of control: (*a*) Mandatory control by the Federal Government; (*b*) mandatory control by the States and/or subdivisions of States, such as counties, municipalities, or forest districts; (*c*) public or cooperative control at the option of the owners themselves. Certain combinations of the three might be desirable; for instance, the Federal Government might assist the States financially and otherwise to carry out control under State laws, just as is being done now in fire protection. The division of responsiblity for the exercise of control is discussed in another section of this report.

In cases where no legitimate form of control or voluntary action under private ownership can be relied upon to maintain the forest in the condition required by the public interest, provision should be made for expropriation, with due compensation, by Federal, State, or local authorities. This step should be taken before the forest is destroyed, for rehabilitation of devastated forests will require many years and is likely to be much more costly in the long run than acquisition of the existing forest.

OBSTACLES TO MANDATORY REGULATION

ANTAGONISM OF FOREST OWNERS

As has been shown, the right of the public to protect its own interests and those of individuals by restrictions upon the use of private property has sound legal basis and is freely acknowledged, in principle. Nevertheless, aversion to outside control over one's own actions is deeply ingrained in human nature. In part, objection to public control is purely selfish. In part, however, it is due to a sincere fear that control would be abused: that it would be unreasonable, would not stop where it properly should stop, or would give some individuals an unfair advantage over others. Opposition on the grounds that it would cost the taxpayers money or that it would involve an extension of bureaucracy is largely specious or due to a lack of understanding as to just what public regulation might involve.

If public control were really believed desirable or necessary, no reasonable person would object to a reasonable cost or to the setting up of the requisite enforcement organization. As was pointed out in the sections "Is Forestry Justified?" and "Watershed and Related Forest Influences," the devastation of forests has cost the taxpayers a great

deal more than any system of regulation likely to be proposed. Moreover, the enforcement of fire laws and restrictions on denudation of forest cover, even when coupled with such contributions toward protection and management as the public should equitably make, is bound to cost less, at least during the next few decades, than public purchase and management of the entire forest area.

In the case of forests, the fear of bureaucratic control may be attributed in part to the vagueness which has enshrouded most of the discussion of the subject. With some degree of justification, many have assumed that a public agency would be empowered to specify in detail how an owner may manage his land and cut his timber, and would be given a free hand to try out all sorts of silvicultural fads at the owner's expense. If this were to be the case, there would be good reason to shudder at the extension of bureaucracy. Silviculture is not an exact science, and it is impossible to standardize methods of handling forests under the great diversity of conditions which exist. No public agency (or private, for that matter) is wise enough to dictate the specific methods to be followed by forest owners. Such dictation is neither necessary nor desirable. All of the regulation that is necessary to protect the public interests can be accomplished without it. As a general thing, it should be necessary to interfere with an owner's management of his forest only when his practices are prejudicial to the public interests.

Where the proposals for public regulation have been definite and obviously reasonable, there has been less opposition. For example, there is little opposition now to restrictions on the use of fire during danger seasons, or on the careless use of fire in general. Such requirements are incorporated in the laws of most States, and have the backing of a considerable body of public opinion.

Likewise, there is not much opposition in principle to requiring such disposal of logging slash as may be necessary to obviate undue hazard to neighboring property. There is more opposition in practice, however. Slash disposal may be costly. Operators are not anxious to spend any more than is absolutely necessary to reduce the fire hazard, since from the individual point of view this appears to be an unproductive outlay. Naturally, it is feared that the public agencies responsible for enforcing the requirements may insist on more intensive and costly measures than are really necessary. There is some ground for this feeling, because the underlying principles and the technique are not yet thoroughly understood, even by foresters. Many States have enacted laws dealing with the disposal of slash, and the necessity of adequate slash disposal is fairly well recognized in most forest regions, but there is still difference of opinion as to what the requirements should consist of and how they should be determined.

PUBLIC INDIFFERENCE

The opposition of persons who would be subject to regulation is passively supported by the indifference of the general public, which has not realized that mistreatment of forest lands has any particular effect on its own interests. These two factors combined constitute the greatest practical difficulty confronting a policy of

public regulation. Until they can be in a large measure overcome, it will be difficult to get adequate regulatory laws adopted, or to enforce the laws that may be adopted.

CONTROVERSY OVER JURISDICTION

Another thing which has confused the issue is the controversy as to whether control should be exercised by the Federal Government or by the States. This is a very important problem when it comes to the application of public control. It is discussed in the section of this report which deals with The National Programs and the Responsibility for Them. It should not be allowed to obscure the fundamental question, namely, whether any public agency should exercise any control over the use of private forests.

SUMMARY OF ARGUMENTS AGAINST AND FOR PUBLIC REGULATION IN THE UNITED STATES

Various arguments have been or may be advanced in opposition to a policy of public regulation. The principal ones, together with the corresponding arguments in favor of regulation, are briefly as follows:

1. *Against regulation.*—Regulation is not necessary, because we shall not need forests in the future. This argument is based primarily on misgivings as to future timber requirements.

For regulation.—Other sections of this report have shown that the maintenance of forests is of great public concern, not only to supply useful and essential raw materials, but also because of the other, frequently more important, public values of forests. The conservation of forests is an established public policy in nearly all civilized countries. In the United States this policy is recognized both by the Federal Government and by the States through legislation and large expenditures of public funds for maintenance of public forests, for protection of privately owned forests against fire and other damage, for encouragement of forest planting by private owners, and for forest research, education, and extension work. It is also recognized through special forest taxation legislation in many States.

2. *Against regulation.*—Regulation is not necessary, because private owners, in pursuing their individual self-interest, can be depended on to handle their forests in such a manner as to serve the public interest. That this has not generally been the case in the past was because the public put obstacles in their way, or did not do its share in removing existing obstacles.

For regulation.—The public welfare has suffered, and is still suffering, great and well-nigh irreparable injury as a result of the destruction and deterioration of forests under a policy of unrestricted freedom of private action. Even if the public should do all that it legitimately could in helping forest owners, there would be no assurance that every owner would handle his forest in the public interest. Regulation would impose restrictions only on those who proposed to act contrary to the public interest.

3. *Against regulation.*—For the public to interfere in the management of privately owned forests would be a radical invasion of the rights of private property, contrary to our traditional policy.

For regulation.—It has been shown in the preceding pages that for the public to regulate the use of private property in order to protect and promote the public welfare does not involve any new or untried principle. On the contrary, this policy is firmly established in the legislation of this and other countries. Instead of being an unwarranted invasion of private property rights, it is necessary for the defense of private property as well as the public welfare. The destructive practices of some owners make it difficult for other owners, who would like to handle their forests conservatively, to do so.

4. *Against regulation.*—A policy of public regulation would necessitate an army of public employees and bureaucrats whose meddlesome interference would stifle private enterprise.

For regulation.—No large number of public employees would be necessary. Regulation can and should be decentralized, and the owners should have a share in it. Owners who follow good practices would not be interfered with. There need be no attempt to dictate details of management.

5. *Against regulation.*—Regulation would mean further Federal encroachment on the authority and responsibilities of the States.

For regulation.—Regulation need not be centralized. Where only State or local interests are involved, the States would naturally decide upon their own policies of regulation, without interference from the Federal Government. Direct Federal regulation would logically be confined to cases involving national or interstate interests, where these will not be protected by State or local action. Even in these cases, there is no reason why Federal authorities should not cooperate closely with the State authorities. If the State laws and their enforcement in any State should be adequate to protect the Federal interests, Federal interference would not be necessary.

6. *Against regulation.*—Forest owners cannot afford to adopt the measures that might be required of them.

For regulation.—To the extent that restrictions consist merely of prohibition of acts that will cause direct harm to others, the cost to the owner of abstaining from such acts is not a legitimate consideration. This is a long-established principle of law. Restrictions that go beyond this, which will not bring an offsetting benefit to the owner, would be justified only if the public bears the expense.

7. *Against regulation.*—The cost of regulation would add greatly to the burden of the taxpayers.

For regulation.—Devastation and deterioration of our forests has been exceedingly costly to taxpayers, both through the loss of industries and shrinkage of the tax base in forested regions and through the cost of remedial measures such as flood control works and dredging of silt from rivers and harbors. In comparison with these costs, the cost of regulation would be ridiculously small, even when coupled with greatly expanded public assistance in forest protection and development. At least for the next few decades it would be cheaper for the public to prevent further forest devastation by means of suitable restrictions upon the acts of the owners than to acquire and rehabilitate a major portion of the forest land after the forest cover has been destroyed.

8. *Against regulation.*—Existing regulation, though mild in scope, is not well enforced in most States and is not particularly effective.

For regulation.—Existing regulation has not had a fair chance to become fully effective. Much of it is relatively new, forest owners in many instances are not aware that the laws exist, and adequate funds and personnel have not been provided for enforcing them. Moreover, the public has not always done its part in helping forest owners.

9. *Against regulation.*—Regulation would not be effective because of the antagonism of forest owners.

For regulation.—As explained above, part of the antagonism to the idea of regulation is due to a misconception as to what regulation would involve. Other sturdy individualists object because of a disinclination to allow a public agency or anyone else to tell them how to run their business. The newer generation of forest owners, however, has a better understanding of the evil results of unrestricted private exploitation than their predecessors had. If the public will do its part, it is not fantastic to believe that many owners will accept and even welcome a reasonable degree of restriction, providing it is applied impartially to all owners. As soon as a large proportion of forest owners, or of the more influential owners, can be made to see that a certain amount of restriction would be for the best interest of all and would not involve excessive interference with private business, such regulation can be effective. Regulation of a considerably more intensive character than might be desirable at the present time in the United States was quickly accepted by the forest owners and has been very effective in Norway, Sweden, and Finland.

10. *Against regulation.*—Public opinion is indifferent. Without the support of an informed public opinion, regulation would not be practical.

For regulation.—The public is rapidly becoming cognizant of the desirability of forest preservation. The damage done by forest fires is much better understood than it was. Events of the last few years have brought the dangers of floods and erosion prominently to public attention. The value of forests for recreation is appreciated as never before. The old idea that practically all land is suitable for agriculture is now pretty well exploded and it is more evident than formerly that a considerable area of forest land will have to remain in forest if it is to produce anything. Even forest owners are beginning to realize that devastation of most forests is unprofitable and economically foolish.

11. *Against regulation.*—Instead of trying to regulate private owners, the public should buy, or acquire by other means, all of the forest land.

For regulation.—Land acquired through tax default or through gift is likely to have had its productive and protective values seriously impaired before the public gets it. Purchase of the major portion of the still productive land would certainly be costly, and even if such a program could be agreed upon it would require many years for completion. Some provision should be made to prevent devastation of such land during the interim before it is acquired by the public. Moreover, under the most ambitious plan of public acquisition that is likely to be adopted, so far as can be foreseen at this time, a very large area of forest land will remain in private ownership.

CONCLUSION

Existing control does not go far enough to protect the present or future generations. It is to be expected that proposals for more adequate enforcement of existing legislation, as well as for further requirements, will meet with opposition and indifference. However, this is no reason for dropping public regulation as one of the essential means for insuring that our forest resources will be perpetuated and handled so as to promote the public welfare. On the contrary, every effort should be made to obtain the backing of public opinion, including the forest owners, for adequate regulation.

To do this will involve a continuous process of education regarding the importance of forests to the welfare of individual citizens and of the public as a whole. It should be made clear, particularly to forest owners, that such regulation as is proposed will not unduly interfere in the handling of their property, and that in the long run it will be to their advantage through preserving property values and extending the life of forest industries. As soon as practicable, regulation based on the principles outlined above should be adopted as a public policy. Specific suggestions for a program of public regulation of private forests in the United States are given under the heading "A Possible Program for Public Regulation" in a later part of this report (The National Programs Required and the Responsibility for Them).

A POSSIBLE PROGRAM OF PUBLIC REGULATION

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As has been shown in preceding sections of this report, it is a matter of deep public concern that our forests be maintained in such a condition that they can continue to furnish timber, protect watersheds, check erosion, and contribute in other ways to the welfare of society. It has also been shown that there is a considerable degree of apparent conflict between the interests of society as a whole and what individual forest owners conceive to be their own interests, so that in pursuing his own objectives an owner may frequently do great harm to other individuals or to the public. Any public policy of forest conservation, whether it is built around public ownership, public assistance to private owners, or regulation of private owners, is based primarily upon the public's responsibility for protecting the public values of forests. The imposition of restrictions upon the handling of privately owned forests has further basis in the universally recognized duty of government to protect its citizens and their property against injury by others.

It is probable that the public interests can be served most effectively and economically, and with a minimum of interference in private enterprise, if the public owns a substantial portion of the forests. On the basis of present trends, great expansion of public ownership appears to be both desirable and inevitable. However, it is to be expected that considerable time will elapse before the public acquires all of the forest that should eventually be owned. Moreover, a considerable area is likely to remain in private ownership indefinitely. It may be desirable, therefore, to provide for a moderate degree of public regulation in order to protect the public interests and to redeem government's responsibility for protecting lives and property. A program of public regulation which might accomplish these purposes is outlined in the following pages. It is presented here as a suggestion for the form which public regulation might be expected to take, rather than as a program for immedate adoption in all particulars. Even such a moderate program is likely to be adopted only gradually, although several States have already made a considerable start.

DIVISION OF RESPONSIBILITY

The minimum degree of regulation under which the public can redeem its responsibilities is that which will prevent abuses which directly injure other individuals or the public. Under our form of

government, the responsibility for preventing such abuse is shared by the Federal Government and the States. Under certain conditions the Federal Government clearly has jurisdiction; under other conditions, although the national interest is also involved in a general way, the responsibility is primarily the States'.

THE STATES' RESPONSIBILITY

Individual States have ample authority under the police power, and it is their proper function, to prohibit practices on privately owned forests which will harm the public or other individuals besides the owner. In addition to such regulation as may be undertaken in cooperation with the Federal Government for interstate or international reasons, each State should exercise such control as may be necessary:

(1) To prevent injury to persons or property within the State, or to property of the State or subdivisions thereof (including land or other property which the public intends to acquire).

(2) To promote the public health, including prevention of stream pollution, stabilization and protection of municipal water supplies, preservation of recreation values, etc.

(3) To protect roads, railroads, waterways, and streams used for irrigation and power purposes.

(4) To protect game and wild life in general.

(5) To promote the general welfare within the State by preventing depletion and waste of resources and the consequent ruin of business, industries, and communities, within the limitations established by the constitutions of the State or the United States. States individually or jointly through compacts can probably act to prevent the waste of forest resources, as California, Oklahoma, and Texas have attempted to do in the case of gas and oil.

FEDERAL RESPONSIBILITY

The Federal Government's interest in and responsibility for conserving forests have been recognized repeatedly by the Congress. The act of 1897 provided for reserving and administering the national forests "for the purpose of maintaining favorable conditions of water flow and to furnish a continuous supply of timber for the use and necessities of citizens of the United States." The Weeks Law of 1911 provided for acquiring and managing forests, and also for cooperating in the protection of private forests, to protect the watersheds of navigable streams. The Clarke-McNary Act of 1924 provided for contribution from the Federal Treasury to assist in the protection of forests in general, and for promoting forestry on private lands, because the maintenance of forests was recognized as essential to the national welfare.

Beyond question, the authority of the Federal Government is paramount in the protection of forests or other property belonging to the Government (including forests which the Government intends to acquire), in the prevention of damage of an interstate or international character, in maintaining the navigability of streams and harbors, and in the promotion of the national defense. Within these limits jurisdiction of the States and the rights of individual property

owners are clearly subordinate. There can be no reasonable doubt but that the Federal Government has the responsibility and the legal right to exercise such control over both public and private forests as may be necessary to accomplish these objectives. If the Federal Government has the power to spend Federal funds in purchasing forest land for these purposes and in restoring a forest cover on such lands, it is logical to conclude that it also has the power to prevent the destruction which will make such acquisition and reforestation necessary.

SCOPE OF STATE REGULATION

FORESTS IN GENERAL

It does not seem to be practicable for either the States or the Federal Government at this time to require that private forests be managed on a sustained-yield basis or under the supervision of foresters. It is desirable, however, that each State should follow the example already set by several States and adopt the following minimum requirements with respect to all private forests except those so small in area or so isolated that their destruction can harm no one but the owner. It may also be desirable for States, groups of States, or the Federal Government to cooperate with the forest industries in regulating output so as to prevent waste of the resource and insure its perpetuation through sustained yield.

PROTECTION AGAINST FIRE

(1) The creation of abnormal hazards should be prohibited. These include large accumulations of slash; extensive clear cutting where topography, soil, and climatic conditions favor excessive drying out or rapid spread of fire; and careless use of fire, such as brush burning or operation of railroad and logging engines without taking due precautions against the start and spread of fires.

(2) To the extent that fire hazard arises from the activities or negligence of owners or operators, they should be required to bear a large share of the cost of prevention and suppression, either directly or through support of organized associations, or preferably through contribution to the State (special fire-protection assessment). They should be also required to construct and maintain suitable firebreaks around slashings or other areas where there is special danger of fires starting or spreading. Protection of forest property against fire hazards which do not result from action or negligence of the owners should as a rule, be a responsibility of the public. An owner of a forest, or any other sort of property, who pays taxes, is entitled to protection against damage by outside agencies, at public expense.

PROTECTION AGAINST INSECTS AND DISEASE

In the case of serious insect or disease infestations which threaten to spread to the forests of others, the State forester or other official should be authorized to prescribe preventive or control measures, where effective measures are known, and to require the interested owners to cooperate in their execution, up to a specified maximum cost per acre.

NOTICE OF CUTTING

Owners or operators should be required to notify the State enforcement authority in advance of any commercial cutting (i.e., except a thinning or improvement cutting) of more than 5 acres. Advance notice might be dispensed with where the operation follows a previously approved plan, but in that case the appropriate authority should be notified on completion of the cutting, in order that the area may be inspected to see that requirements for slash disposal, etc., have been complied with.

REGULATION OF CUTTING

Timber cutting far in excess of market requirements is contrary to the interests of the individual timber owners as well as of society as a whole. It tends to depress prices of forest products so low that the owner gets nothing for his stumpage, and in many instances the operator does not even recover the costs of logging, manufacture, and distribution. Industrial chaos results. Much of the timber that is cut is wasted, and the growing stock which is essential for continued timber production is unnecessarily depleted. Owners then have neither the incentive nor the financial resources to keep their land productive, and much of it, after being so badly wrecked that it can produce nothing of value for many decades, sooner or later reverts to public ownership. Consumers reap very little benefit from the lower prices while they last.

It is obvious that orderly production, adjusted to the growth capacity of the forests as well as to the demand for forest products, would in the long run be best for the timber owners and producers as well as the consumers and the public as a whole. General public control over production is not advocated at this time. However, it may be practicable for States or groups of States, or, preferably, for the Federal Government to cooperate with the industry in working out methods for stabilizing timber production and marketing which will safeguard the interests of producers and consumers and the general public. Cooperation of this character would be especially desirable for the purpose of preventing waste of resources and demoralization of industry in the Pacific northwest and in the South. Such an arrangement should involve a sufficient degree of public control over the allocation and rate of cutting and the management of the forest to insure permanence of the industries in given economic units and also might include public assistance to both operating and non-operating timber owners.

PROTECTION FORESTS

Each State should provide for the classification of forests where the maintenance of a continuous forest cover is essential in order to prevent damage to persons or to public or private property.

The State should require that these forests be handled in such a manner as not to jeopardize their protective value or endanger the property or welfare of others. In general, this would mean merely prohibition of deforestation, guarantee that cut-over areas will be reforested by natural or artificial means, and maintenance of a forest cover. Sustained yield management would not be required, but should be encouraged.

The decision as to classification should preferably be handled by a State board, composed of qualified experts. It should be initiated either by the board itself, or upon application of an interested State department or of municipalities, associations, or individuals.

The general requirements should also be formulated by the State board. Both in the classification of protection forests and in the formulation of restrictions on their management, the board should be required to consult the forest owners as well as representatives of the local communities or other parties whose interests may be involved. The State forestry department should be charged with the specific application and enforcement of the law, subject to appeal to the board.

Some, but by no means all of these protection forests will also be classified as Federal protection forests, as provided below. In such cases there should be no conflict of authority. Both State and Federal governments should have concurrent jurisdiction to enforce their respective requirements. Generally, however, the State and Federal requirements will be similar. Where the State laws and enforcement organization are adequate, the enforcement of Federal requirements can be delegated to the State agency, subject to Federal inspection and with appropriate Federal contribution toward the costs.

SCOPE OF FEDERAL REGULATION

PROTECTION FORESTS

CLASSIFICATION

The first step in a program of Federal regulation would be to provide for classifying and listing the forests that should be subject to Federal control because of their relation to navigable waters, to national defense, or to national forests, national parks, or other national property, or in order to prevent damage to persons or property beyond the boundaries of a State. These might be termed "Federal protection forests." Appropriate legislation should prescribe the general principles upon which the classification is to be based and the general methods of procedure, and should set up a suitable agency with authority actually to carry out the classification. The classification itself is a quasi-legislative task. One method would be for Congress itself to designate protection zones by law, somewhat as additions to the national forests in certain western States have been handled since 1907. This method has certain merits, but probably would be unnecessarily cumbersome. A better way would be to authorize a suitable impartial commission or board to decide upon the classification.

The National Forest Reservation Commission, which passes upon proposed Federal purchases of forest land, might be reorganized as to functions so as to become the classifying agency, under the name of National (or Federal) Forestry Commission (or Board). This would be appropriate and logical because the protection zones will correspond in a general way to the areas within which the Government owns or is acquiring forest land, and because a considerable portion of the protection forest now in private ownership may eventually be acquired by the Government.

The Board should classify protection zones on its own initiative, or upon application by the Forest Service, the Bureau of Chemistry

and Soils, the Reclamation Service, the War Department, Federal or State power authorities, a State, a city, an association of water users, or any other group or individuals whose interests would be affected by the treatment of forests in a State other than their own. So far as practicable classification should be carried out under a comprehensive and systematic plan, rather than in a hit-or-miss fashion on the basis of individual applications. Those areas should be classified first which the most obviously have protective value of more than local significance. The classification should be made only after an examination by experts, and after all interested parties have had an opportunity to be heard in support of or in opposition to the classification.

Logically, the Federal Government should have authority to prevent devastation of any forest within a classified Federal protection zone, regardless of its ownership. Ordinarily, a forest owned by a State, county, or municipality would be conservatively managed without Federal interference. In the comparatively few instances where this might not be done, it is probable that a sufficient degree of control would readily be relinquished to the Government in return for equitable assistance in fire protection, reforestation, and road building. This contingency could be taken care of by authorizing the Federal Board to enter into cooperative agreements with States, counties, or municipalities under which their forests within Federal protection zones would be handled in a manner approved by the Board and would then be entitled to the same Federal contributions as those granted for private forests.

RESTRICTIONS ON MANAGEMENT

Restrictions should be based on the general principles, which should be incorporated in the law, that the forest must be maintained in such a condition that it will continue to afford protection against erosion, floods, and drought, and that it may not be handled in such a manner as to jeopardize its own continued existence or to endanger neighboring protection forests, forests belonging to the Federal Government, or forests in other States. The same principles would apply in the case of forests along the Canadian border, where mismanagement might cause injury to forests or other property in Canada.

Methods of handling which tend to increase risk of fire, windfall, insects, etc., should not be allowed. Deforestation of more than a very small area (perhaps 5 or 10 acres) of these protection forests should be allowed only by special permission of the enforcement agency (with right of appeal to the Board). Such permission should be granted only after examination on the ground, public hearing, and agreement by the owner to reforest the land within a definite period if it ceases to be utilized for other purposes. In case the land is particularly susceptible to erosion, permission to clear should be contingent upon the owner's agreement to adopt preventive measures, such as contour plowing or terracing.

Detailed regulations and restrictions should not be prescribed in the law. These should be worked out for each locality by the enforcement agency, in consultation with State or local advisory boards composed of forest owners, State forest officers, representatives of municipalities, and other interested parties. The Federal Board should decide in case of disagreement between the local boards and the enforcement agency. The regulation should cover such matters as

fire protection, slash disposal, methods of insuring natural or artificial restocking, methods of cutting (percentage of stand to cut, conditions under which clear cutting is permissible, etc.), and restrictions on grazing. Provision should be made for the reforestation of land which is already denuded, including abandoned crop and pasture land, where a forest cover is needed for protective purposes.

Within the limitations prescribed, an owner would be free to cut when, where, and as he pleased, and no permit would be necessary. Sustained yield management would not be required.

To facilitate inspection of the cutting, the authorities should be notified each year in cases where an area larger than 5 acres is to be cut over. In order to protect the operator, at least in the larger operations, he should be allowed to submit a plan of work covering method of cutting, slash disposal, provisions for fire protection, etc. Upon approval of this plan, with such modification as might be agreed upon, and as long as he operates in accordance with it, he should be considered as complying with the law and should be free from further restrictions. The Board should reserve the right, however, in case of any material change in conditions, or in case the operation should be evidently resulting in destruction of the protective value of the forest, to require changes in methods, after due notice and hearing. Cutting operations should be inspected regularly, and the inspectors should have power to stop operations where the requirements are not being complied with.

ENFORCEMENT AGENCY

The application and enforcement of public control over Federal protection forests, other than those owned by the Federal Government, might be carried out by agents of the Federal Board. In Sweden the foresters attached to the county boards (local boards also) are responsible for seeing that the regulations are complied with. They are entirely independent of the State forest service, which confines its activities to management of the public forests. In this country, however, it would probably be better to have the Forest Service act as the enforcement agency. The Service already has a certain degree of responsibility for the promotion of private forestry and maintains a staff of inspectors in connection with cooperative fire protection and distribution of planting stock under the Clarke-McNary law. Moreover, the protection forest zones will embrace not only a large proportion of the existing national forests but also large areas now in private ownership which probably will sooner or later be added to the national-forest system. It does not seem to be either necessary or desirable, therefore, to create a separate agency whose functions would to some extent parallel or overlap those already performed by the Forest Service.

PUBLIC OBLIGATIONS ACCOMPANYING PUBLIC REGULATION

As has been pointed out, a forest owner is not legally or morally entitled to compensation for refraining from acts which would directly injure the persons or property of others. Elimination or avoidance of fire hazard resulting from his own operations should be entirely at his own expense. At the same time, however, he is entitled to expect

that the public will help to protect his property against fire and other damage caused by others.

Protection forests, moreover, are in a sense quasi-public forests, even though the private owner retains the title. The owner may be required to sacrifice income or undergo expense purely for the benefit of other individuals or the public as a whole. The cost of carrying out such requirements, so far as they do not return a direct benefit to the owner, should be recognized as an obligation of the public. Public funds contributed for these purposes should not be regarded as a bonus or gratuity, or as a bribe or bait to induce the owner to adopt the desired practices. Adoption of these practices should be mandatory; but the public, which enjoys the benefits, should pay the costs.

THE STATES' SHARE

FIRE PROTECTION

Each State should provide fire protection for all forests within its borders, except those owned by the Federal Government. The cost should be paid partly from the State treasury (with such contribution by towns or counties as may be agreed upon), partly by Federal contribution (see below), and partly by a contribution from the owners, either in the form of a special fire-protection tax or in some other form. Except for the costs of eliminating hazards resulting from operations, all of which should be borne by the owners or operators, it would be reasonable to expect the public (Federal Government, States, and smaller units) to pay at least 50 percent of the protection cost for ordinary nonprotection forest and 75 to 100 percent in the case of protection forest. Where the owners are in no way responsible for the fire hazard, public agencies should pay the entire cost of protection. The States' share might be 25 to 75 percent for nonprotection forest, 25 to 50 percent for State protection forest, and 0 to 25 percent for Federal protection forest.

In order that owners may know fairly definitely what protection will cost them, in case they are required to contribute, it might be desirable to provide that the assessments shall not exceed a fixed sum per acre in any one year, and that the actual amount to be collected in each year shall be determined by the State forestry board, subject to this limitation. It might be desirable in some instances that the State also collect a small assessment from the owners of nonforest property which benefits directly from the maintenance of the forests (e.g., water users, recreation interests, etc.). This is done now by several California counties.

FOREST PLANTINGS

The State should furnish planting stock and technical advice and supervision at nominal cost for afforestation in classified protection areas, except where the land has been denuded in violation of the regulations. In cases where owners may be required for reasons of public interst to afforest land already denuded, the entire cost should be borne by the public.

FOREST TAXATION

The State should provide that the assessed valuation of protection forests (Federal or State) for purposes of taxation shall take into account any reduction in value due to restrictions on their management.

FEDERAL GOVERNMENT'S SHARE

Inasmuch as the necessity for preserving Federal protection forests is based on national needs, and since the benefits will accrue primarily to the inhabitants of other States rather than to the owners of the land or to the States within which the forests are situated, it is equitable that the Federal Government should bear a considerable share of the costs of maintaining these forests, even where it does not own them. It is proposed, therefore, that the Federal Government should pay a large portion of the protection costs in addition to providing the enforcement personnel (inspectors) and paying the costs of classification.

The Federal Government would be justified in paying 50 to 100 percent of the cost of fire protection for forests within the Federal protection zones—the proportion to depend upon the relative benefits from protection to the landowner, to the State or local community, and to the Nation as a whole, and upon the extent of hazard due to other causes than the owner's operation. The owner should bear the full cost of slash disposal and other measures designed to avoid the creation of hazard. The entire cost of protecting federally owned land should, of course, continue to be borne by the Federal Government.

Because of the relation of forests outside the Federal protection zones to the general welfare of the country, the Federal Government is justified in continuing the present policy of contributing toward the cost of protecting these. A reasonable ratio would be 50 percent for forests within classified State protection zones and not more than 25 percent for ordinary nonprotection forests.

The division of protection costs would then be as follows:

	Federal Government	State	Private owners
	Percent	*Percent*	*Percent*
Ordinary nonprotection forest	25	25–75	50–0
State protection forest	50	25–50	25–0
Federal protection forest	50–100	25–0	25–0

This arrangement would recognize the responsibility of the Federal Government for insuring the protection of forests of interstate significance, regardless of action by the States or the owners. At the same time, it would respect the principle of cooperation with the States in protecting forests in general, and hence would retain the stimulus to State action that is provided by the Clarke-McNary law.

The above Federal contributions should apply not only to private forests, but also to those owned by States, counties, or municipalities and located within the designated protection zones. In the case of such publicly owned forests, however, Federal assistance should be granted only if and so long as the forests are managed in a manner satisfactory to the Federal Board.

COST OF PROGRAM

The cost to the public of a program of regulation such as that outlined above can be estimated only very roughly, and with a very wide margin of error. It would depend on how large an area should be

classified as protection forest, and on the division of costs between the public and the forest owners. The public would have to pay as much or more if the forests were brought into public ownership. A large portion of the costs would also be borne by the public under a policy of public assistance to private owners, even if no regulation were involved.

The major costs peculiar to a program of regulation would be the expenses of the Federal and State forestry boards or their agents in classifying protection forests and formulating regulations, and the costs of maintaining a force of inspectors to see that regulations are complied with. The work of the boards would be heavy during the first few years, until the bulk of the classification is completed; after that the task would be considerably smaller. Expenses of the Federal board might be about $50,000 a year, and of the State boards about $100,000 a year altogether. The preliminary task of classification, which perhaps would be spread over a 5-year period, might cost altogether $250,000 for Federal protection forests and $150,000 for State protection forests. Enforcement of the law might require 50 to 60 Federal inspectors, at a total cost, including salaries, travel, and clerical assistance, of about $500,000 a year. Additional cost to the State forest departments for enforcing fire laws and restrictions on State protection forests might aggregate $150,000 a year.

At a rough estimate, possibly 160 million acres of the present privately owned commercial forest area might fall within Federal protection zones, and 65 million acres additional within State protection zones. This would leave about 172 million acres of privately owned nonprotection forest. If the costs of protection should be divided somewhat as proposed above, and if the total cost of protecting privately owned forests should be about $20,000,000, as indicated in another section of this report ("Protection Against Fire"), the Federal Government would pay approximately $9,500,000 a year, the States about $6,750,000, and private owners about $3,750,000. This does not take into account the noncommercial forest area, a relatively small proportion of which is privately owned, nor the abandoned farm land that is reverting to forest but not yet classed as forest land.

CONCLUSION

The plan outlined above is in line with the policies which have been worked out by a large number of countries that are in approximately the same stage of economic development as the United States. It recognizes the fact that a large proportion of our forest land will continue for many years in private ownership. It seeks to avoid interference with private property beyond what is necessary to safeguard the rights and welfare of the public. Except for requirements designed to prevent the spread to other property of fire, insects, and disease, mandatory regulation would be limited to classified protection forests, and there only when such interference is necessary. The Federal Government would have jurisdiction over protection forests where the injury threatens to pass State boundaries or to affect Federal property or interests within the State. Beyond this, control would be left in the hands of the individual States. In either case, the control measures would be formulated largely by boards or commissions in consultation with forest owners.

The plan does not contemplate that the cost of maintaining the protective values of the forest would be imposed upon the private owners. It proposes to apportion the costs of the program in an equitable manner between the Federal Government, the States, and the forest owners, as nearly as possible commensurate with the benefits to be derived. It endeavors to retain the principle of cooperation in a form which would induce the willing acceptance of regulation by forest owners, and which at the same time would insure that the public expenditures in aid of private forestry will accomplish the results that are intended.

As stated at the beginning of this section, a program of public regulation such as has been described would supplement an acquisition program. It would aim at preventing the devastation of forests which the public might later acquire, and at protecting the public interests, to the extent that might be necessary, in forests which will remain more or less indefinitely in private ownership. Public regulation is not advocated as a general substitute for eventual public ownership of a large proportion of the Nation's forest land.